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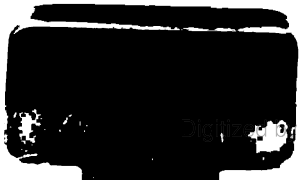

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EDUCATION AND PROFESSIONAL EMPLOYMENT IN THE U.S.S.R.

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Prepared for the National Science Foundation
by the Office of Scientific Personnel
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Foreword

THE CONTINUING study and assessment of the capabilities of other nations in science and technology play an indispensable part in the formulation of our own national policies. The decisive role of education in the development of the professional manpower potential, particularly in science and engineering, and the responsibility of education for the recent large-scale Soviet technological advances are universally recognized.

Since publication by the National Science Foundation of *Soviet Professional Manpower* in 1955, the dynamic growth of Soviet scientific and engineering manpower has markedly accelerated, and there are currently indications that the Soviet Union intends to place even stronger emphasis upon engineering development and scientific research. These developments call for a continuing reappraisal of conditions in the Soviet Union and the provision of up-to-date information. It is hoped that the publication of the present volume will fill this need.

The present study was sponsored by the Foundation and prepared by the author under the auspices of the Office of Scientific Personnel, National Academy of Sciences—National Research Council, under the direction of Dr. M. H. Trytten. The research was conducted primarily at the Russian Research Center, Harvard University, drawing upon the rich resources of Soviet publications and other sources of information there as well as the helpful advice of staff.

Mr. Nicholas DeWitt, internationally recognized authority on Soviet education and professional manpower resources, has written widely on Soviet affairs. He was educated in Europe and Russia itself, later continuing his undergraduate and graduate studies at Harvard. He has been associated with the Russian Research Center for the last eleven years. Mr. DeWitt has lectured in a number of American universities and has also been engaged as a researcher and consultant for several institutions, including the Massachusetts Institute of Technology, the University of North Carolina, the National Bureau of Economic Research, the Battelle Memorial Institute, the Council for Economic and Industrial Research, and United States governmental agencies.

The new study is not merely a revision of *Soviet Professional Manpower* but constitutes an entirely new research effort, drawing upon the increased flow of Soviet official data as well as Western reports, accounts of visitors to the Soviet Union, and various other sources of information. As indicated in the author's preface, a preliminary draft of this report was circulated to a panel of Government and academic experts in the field of Soviet studies and education for review and comment. The present study has therefore had the benefit of available authoritative criticism.

In addition to a presentation of factual information this volume attempts a comprehensive and scholarly assessment of the Soviet educational system and professional manpower potential as it has developed in the past and as it is now emerging in the course of the current educational reforms in the U.S.S.R.

ALAN T. WATERMAN,
Director, National Science Foundation

AUGUST 1961

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Preface

The dramatic events of the mid-twentieth century bear adequate testimony that the rate of the development of science and new technology is one of the most decisive factors in determining the economic and political power of a nation and its international position. A detailed knowledge of the educational systems of the world in meeting the needs of economic and social development becomes increasingly important, particularly in regard to professional scientific and technical manpower. The education of such specialists encompasses a period of 15 to 20 years, and thus the educational policies which are followed today affect the power potential of a country two decades hence.

The profound economic, political, social and cultural transformations which have taken place in the Soviet Union during the last few decades are of great and continuing concern to the free world. Almost 8 years have passed since the initial effort by the present author to examine the Soviet educational potential and specialized manpower resources was made for the Office of Scientific Personnel, National Academy of Sciences–National Research Council. This effort resulted in the publication by the National Science Foundation in 1955 of *Soviet Professional Manpower—Its Education, Training, and Supply*. In 1958 research was begun on what was intended to be merely an updating of this earlier study. The extensive amount of new information, however, and in particular the reorganization of the Soviet educational system called, instead, for a new and completely revised study.

The present study was prepared under the sponsorship of the National Science Foundation as part of the project on education and professional manpower in the communist bloc countries of the Office of Scientific Personnel of the National Academy of Sciences–National Research Council. I am indebted to Dr. M. H. Trytten, director of the Office of Scientific Personnel, for his guidance and interest throughout the course of the preparation of the manuscript. It is a happy privilege to acknowledge the valuable assistance and support of the Foundation's director, Dr. Alan T. Waterman, its associate director, Dr. Harry C. Kelly, and the continuing cooperation of numerous Foundation associates, particularly Dr. Bowen C. Dees, Mr. Thomas J. Mills, and Mr. Robert Cain.

The National Science Foundation and the National Academy of Sciences–National Research Council in turn express their appreciation to the individuals who aided this study in various ways—sharing information, providing counsel, reviewing the material or otherwise collaborating in the research—and to the U.S. governmental agencies and private institutions for their cooperation and the use of facilities.

Most of the research, the reconciliation of material, and the preparation

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of the manuscript were undertaken at the Russian Research Center, Harvard University. To this institution, its director, Professor Merle Fainsod, its associate director, Dr. Marshall D. Shulman, and to other members of the executive committee, I owe a debt of gratitude. The project has profited particularly from the thoughtful advice offered by Professors Abram Bergson and Alex Inkeles of the Center's executive committee.

Our other acknowledgments are numerous. After the preliminary draft of the manuscript was completed in mid-1960, many scholars and observers of Soviet affairs were asked to review it. I am indebted to them for their many suggestions and comments, all of which were of great help in the final revision of the manuscript. Dr. Trytten joins me in these acknowledgments. Specifically, to:

Prof. George Z. F. Bereday, of Teachers College, Columbia University, for a thorough review of the manuscript, particularly chapters I–IV, analytical and editorial comments and additional bibliographic leads;

Dr. S. Cole Blasier, a former Foreign Service officer and Soviet political analyst with the U.S. Department of State, and now of Colgate University, for a general review of the manuscript;

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Prof. William W. Brickman, of the School of Education, New York University, for a review of source materials and bibliographic suggestions;

Prof. Warren W. Eason, Department of Economics, Princeton University, for a most thorough review of the manuscript, especially the sections dealing with population and manpower trends, and for valuable analytical suggestions and editorial comments;

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operation in the course of the research, supplying leads to primary sources and information compiled by various governmental agencies, and for a general review of the manuscript;

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Prof. William K. Medlin, formerly of the International Education Division of the Office of Education, U.S. Department of Health, Education and Welfare, and now of the School of Education, University of Michigan, for a most thorough review of the manuscript, especially chapter III, and for valuable analytical suggestions and editorial comments;

Dr. A. David Redding, of the U.S. Information Agency, for a general review of the manuscript;

Mr. Michael K. Roof, of the Library of Congress, for a most comprehensive review of the manuscript, many valuable analytical suggestions, additional information and editorial comments.

To those who prefer to remain anonymous but whose criticisms, comments and suggestions were helpful, I am equally grateful.

In addition, Dr. Jerry F. Hough, Department of Government, Harvard University, and Miss Margaret Dalton, of Radcliffe College, were of considerable assistance in compiling data and processing primary sources. Some primary data were also collected by Messrs. Taras V. Butoff and Robert Miller, library research assistants at the Russian Research Center; and valuable bibliographic leads were provided by Mrs. Ina Bonnell, the Center's librarian.

The editorial work was done primarily by Mr. Clark H. Kawakami and Mr. Cary O. Fisher, both associate editors of *Problems of Communism,* U.S. Information Agency. Editorial assistance was rendered also by Mrs. Eleanor Lowman of Washington, D.C.; and Mrs. Julia Stair of Kingston, Mass. The index was prepared by Mr. George A. Chaffee, of Cambridge, Mass.

Mr. A. J. Holston, Chief of Printing and Publications, National Science Foundation, was extremely helpful in handling many details in the initial and final preparation of this study for publication.

Last, but foremost, I am indebted to my wife, Ruth, who rendered her professional assistance in all phases of the preparation, writing, and editing of the manuscript; who typed the several versions of the entire volume through its labyrinth of charts, tables, and appendices; who checked countless figures, footnotes and bibliographic entries; and who took care of equally countless details in the final revising, checking and proofreading. It is by no means an overstatement to say that without her invaluable assistance this study would not have been completed.

CAMBRIDGE, MASS.
AUGUST 1961

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Source Abbreviations Used in the Text

Because of the frequency of citation, it was found convenient to abbreviate some of the source titles throughout this volume. For full titles, the reader is referred to the cross-references in the bibliography. A list of the sources which were abbreviated follows:

APS-NarObr—1957
ASEE
Bartosek, *Vysoké*
Beilin, *Kadry*
BSE-1st
BSE-2d
BSE-SSSR—1948
BSE-SSSR—1957
BSE-YB—1957
BSE-YB—1958
Deineko, *Spravochnik*
Direktivy-SBX—1957
Dos—1957
Eliutin-VSSS—1959
Galkin, *Nau Kadry*
Gorokhoff, *Materials*
Itogi pervogo FYP
KS—1956
KS-RSFSR—1958
Kul't Stroi—1934
Kul't Stroi—1935
Kul't Stroi—1940
Medynskii—1947
Medynskii—1952
Medynskii—1955
NarKhoz—1932
NarKhoz—1959
NarKhoz—1960
NarKhoz-RSFSR—1959
NarKhoz—SBX
NarObr RR—1943
NarObr RR—1944
NKh—1956
NKh—1957
NKh-RSFSR—1957
OE-USSR
Plan kadrov—1930
Plan Khoz
Plan 1935
Plan 1936
Plan 1937
Plan 1941
Podgotovka
SC-Eng—1936
Shtyl'ko, *Pod'em*
Sinetskii, *PP Kadry*
SotsStroi—1933–38
SotsStroi—1934
SotsStroi—1935
SotsStroi—1936
Source X
Source Y
Source Z
SPM
Sprav SSU
Sprav VUZ (with appropriate year)
SSO
SSSR-Tsif—1958
SSSR-Tsif—1959
SSSR-Tsif—1960
Tretii FYP
Trud—1935
Trud—1936
VAN
Voznesenskii, *Voennaia*
Vtoroi FYP
VVSh
VyShkoSPR—1945
VyShkoSPR—1948
VyShkoSPR—1957
Zhenshchina
Zhirnov, *Kul'turnoe*

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Introduction

Ever since Lenin declared that education should be a weapon for moving society forward on the road to communism, the Soviet leaders have used the educational system to serve the state and to help attain its goals. Indeed, since the Communist Party came to power, the Soviet educational effort has been guided by Lenin's dictum: "The contents of education . . . and, in particular, instruction in philosophy, the social sciences and communist moral education, must be determined solely by the Communist Party." [1] This principle, however, involves not only the political and ideological aspects of education; it touches upon the content of education in many other areas as well. The planning of the economic and social development in the Soviet Union is singly directed by the Communist Party, which determines the educational requirements on the basis of the planners' preferences for developing the skills required by a complex industrial society and specifically for satisfying the needs of a rapidly developing economy for technically oriented training of various types.

Over 30 years ago Stalin said: "To build socialism we must possess knowledge; we must master science. And in order to master it, we must learn. We must learn persistently and patiently. We must learn from our friends and, particularly, from our enemies. . . . To master science, to develop . . . specialists in all fields of knowledge, we must study, study, and study more—this is our main task." [2] Twenty-five years later, with Khrushchev at the helm, the drive continued. Said Khrushchev: "To accomplish the transition to communism, the most just and perfect society, where the best moral qualities of free men will find their fullest expression, we must above all educate the man of the future." [3] He thus recognized, as did Stalin two decades ago, that the "birth of the new national, socialist intelligentsia is one of the most important results of the cultural revolution in our country." [4]

The present study is an attempt to put together the great mass of information about the education and growth of the new Soviet intelligentsia: the trained professional and semiprofessional manpower and its deployment in the Soviet economy.

This study has been carried on with two major objectives in mind. Its first aim was to present the most up-to-date information in regard to the educational system of the Soviet Union and to examine the historical trends and present developments in Soviet education, especially insofar as they affect the availability and growth of specialized manpower resources. In this sense, the present study represents a revision of *Soviet Professional Manpower—Its Education, Training, and Supply,* with the addition of much new information which has become available since the appearance of this earlier work. The second objective was to examine the patterns of employment and utilization of Soviet specialized manpower so as to try to understand the relationship between the centralized planning effort and the Soviet educational system. This latter objective constitutes largely a new area which was not ventured into extensively in our earlier study.

In pursuing both these objectives, it sometimes became feasible to make certain generalizations based upon comparisons of information concerning the education, employment and utilization of specialized personnel in the Soviet Union and in the United States. It was hoped

[1] V. I. Lenin, *Sochineniia* (Works), vol. 32, p. 100.
[2] I. V. Stalin, *Sochineniia* (Works), Vol. 11, p. 76.
[3] *Pravda*, Feb. 5, 1959.
[4] J. Stalin, *Problems of Leninism*, Moscow, 1941, p. 644.

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that such comparisons would make the Soviet data and its evaluation more meaningful and would also bring into sharper focus some problems of a universal nature. It was also hoped that the long-run implications and the essential requirements of long-run policies in the fields of education and specialized manpower could thus be made more significant.

Recent Soviet developments are unique in the following respect. The second half of 1955 marked the beginning of the period known as the "thaw." The 20th Congress of the Communist Party, which convened in Moscow in February 1956, witnessed Khrushchev's denunciations of Stalin's rule of terror, and the balance of the year proceeded under the banner of de-Stalinization. The Hungarian revolt and the unrest in the European satellites of the communist bloc marked the end of the period of limited liberalization. During the early part of 1957 a number of economic and administrative reforms were introduced by Khrushchev, which simultaneously opened up for him the path toward consolidation of power.

The Soviet Union's achievements in space exploration by the fall of 1957 helped to overshadow the political setbacks of 1956, as well as the scrapping of the Sixth Five-Year Plan and the oncoming educational reform. The combination of all these events, however, produced a most enlightening flow of information about education, among other areas. With the denunciation of the past and the attempt to create something "new," the flow of information, which prior to that time had been either censored or withheld, was used as an instrument to justify the new policies.

In the field of Soviet education itself, the year 1958 marked the beginning of a new era. It was a year of debate, in which the existing educational system, until then credited with numerous successes, was suddenly found lacking and reorganization begun. The new system is intended to be implemented by 1963. Progress has been slow up until now, and many of the old policies are still in effect. The outlines of the new system are now readily apparent, however, and this study discusses them in detail; but the operational aspects and long-run consequences of the educational reform continue to be uncertain. It is this turn of events in the sphere of education and its effect upon the training of Soviet specialized manpower which have commanded a great deal of attention in this study. The debate which preceded the educational reform provided us with pertinent information concerning past and current problems confronting the Soviet educational effort. Because of the widespread release of information and the discussions in the course of the debate, these problems can now be discussed more meaningfully than ever before.

When an assessment is made of an educational system operating in a society culturally similar to the United States (such as European countries), extensive comment is not so essential as when we deal with an educational system based largely on a different view of man's role in society. The development of the "new Soviet man" in the image of the communist planners is far from being an accomplished fact. Therefore, in discussing the Soviet educational objectives and their actual results we must use all the expository, comparative and interpretive power at our disposal. It is far from trivial to bring out this point. There is a common saying that facts speak for themselves. Quite the contrary—facts never speak for themselves. They always require analysis, interpretation or explanation. The farther removed the observed fact or statistic is from the commonly known frame of reference, the more explanatory variables we need to make it meaningful.

The economic development, the technological change, and the social evolution of society under the impact of both depend upon a large number of people who, in varying degrees of importance and in a multitude of diverse fields, exercise their individual skills. While the overall quantity of labor is primarily dependent upon population growth, the quality of labor is conditioned by the level and type of education, the extent and direction of specialized training, and the experience of an individual or of diverse occupational groups comprising the labor force. Factors affecting the quality of labor become increasingly important in a modern industrial society, which is founded on the application of scientific knowledge to the production and distribution of goods and services.

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Although the entire population and the entire labor force are affected by and are instrumental in the dynamic process of economic development, technological advance, and social change, there is one group within the population and the labor force which merits attention for the particular role it performs. This group, which is more easily visualized than described, is probably, more than any other, responsible for bringing about technological and social change. In fact, it emerges and gains numerical strength because of the progress in science and technology and the increased complexity of modern industrial civilization. It consists of a large number of trained men, specialists of one type or another, professionals of various kinds—engineers, doctors, teachers, scientists, and those engaged in a multitude of other occupations—all of whom have one thing in common. The criterion common to this group which distinguishes it from any other is its professional competence and its special knowledge, which are most frequently acquired through the long process of formal education and long years of training, and less frequently through unusual individual accomplishments or through many years of practical experience. This group of specialized manpower, within the Soviet population, constitutes the main subject of this study.

The supply of professional personnel and, to a great extent, its qualitative characteristics depend upon the ability of an educational system to adjust itself to the changing needs of a society and upon its ability to train a sufficient number of persons for a variety of specialized tasks. This volume will therefore deal extensively with the Soviet educational system, which is the main source providing the economy with a flow of specialized personnel. By devoting a great deal of attention to the educational system, to specific programs of training within it, and to various aspects of educational policy and practice, it is possible to assess many of the qualitative and quantitative aspects of Soviet specialized manpower.

At the same time, because professional manpower is an integral part of a country's population and labor force, the supply of specialized personnel must be considered in relationship to these variables. This constitutes an additional problem, to be considered in the concluding chapter of this volume. Furthermore, because of the close functional relationship between professional activity and semiprofessional tasks, and particularly because of the unique role which semiprofessional education plays in the Soviet Union, specialized semiprofessional manpower will be considered as a separate topic.

Within the professional group, there is a small segment of individuals engaged in various kinds of research, who are called upon to perform more creative or more advanced tasks than the majority of professionals. Most of them are research personnel and scientists, and they too will receive special attention.

In order to pursue these tasks, a consideration of some of the problems concerning the use of definitions and statistics, the availability of information and its utilization is of great importance. In regard to the primary sources, it must be pointed out that there are many difficulties involved in working with Soviet statistics on education and specialized manpower.[5] For the sake of readability, however, it was decided to deal with many of the technical details in the appendices and to concentrate on factual evidence and its interpretation in the text. The reader who is interested in the "perplexities and pitfalls" of Soviet statistical procedures is invited to take his time in going through the appendices to this study.

These considerations, to a large extent, dictated both the sequence and the coverage of the materials presented in this volume.

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[5] See "A Note on the Difficulties Encountered in Working with Soviet Educational and Manpower Statistics" in the appendix to this introduction.

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The Right to Education

ARTICLE 121 OF THE U.S.S.R. CONSTITUTION

As adopted in 1936—

Citizens of the U.S.S.R. have the right to education.

This right is ensured by universal compulsory 7–year education; by extensive development of secondary education; by free education in all schools, higher as well as secondary; by a system of state grants for students of schools of higher education who excel in their studies; by instruction in schools being conducted in the native language; and by the organization in the factories, state farms, machine and tractor stations, and collective farms of free vocational, technical, and agronomic training for the working people.

As amended in 1958—

Citizens of the U.S.S.R. have the right to education.

This right is ensured by universal compulsory 8–year education; by extensive development of secondary general polytechnical education, vocational-technical education, secondary specialized and higher education, based on the principle of the tie between education and life and production; by extensive development of evening and extension-correspondence education; by free education in all schools; by a system of state grants; by instruction in schools being conducted in the native language; and by the organization in the factories, state farms, machine and tractor stations, and collective farms of free vocational, technical, and agronomic training for the working people.

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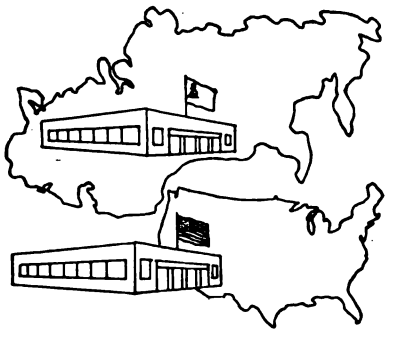

CHAPTER I

The Soviet Educational System

There has been perhaps no more succinct statement of the pitfalls involved in interpreting and evaluating the Soviet system of education in its current state of flux than that given by John W. Gardner in his foreword to Dr. James B. Conant's *The American High School Today*. Mr. Gardner writes:

> The surge of publicity about Soviet schools has produced more false impressions and foolish conclusions than almost any other element in current discussions of education. Sensible generalizations about Russian schools are made doubly difficult by the recent switches in Soviet educational policy. The future direction of Russian education is not clear. And even if we knew exactly where Soviet education was going, the information would be of limited relevance. It is impossible to evaluate an educational system apart from the society which it both reflects and serves.[1]

These observations are very much to the point on at least two counts. First of all, in measuring our own educational system against that of the Soviet Union, there has too often been a tendency to draw comparisons invidious to the American system on the basis of inadequate knowledge not merely of educational realities in the U.S.S.R., but of Soviet society and institutions in general. Obviously such comparisons can be both misleading and harmful. But this by no means detracts from the value of comparison as a fundamental tool of social science research in general, and of research in the field of education in particular. What is essential is that, in employing it, proven methods of scholarly analysis based on empirically established facts be adhered to. Such methods are at the scholar's disposal and are vitally necessary to a realistic appraisal of Soviet education.[2]

Mr. Gardner's remarks underscore a further basic point: namely, the inseparable interrelationship between any system of education and the society it is designed to serve. Beginning with Aristotle, it has been recognized that education and society are interdependent. Twenty-two centuries ago Aristotle said:

> No one will doubt that the legislator should direct his attention above all to the education of youth; for the neglect of education does harm to the constitution. The citizen should be moulded to suit the form of government under which he lives. For each government has a peculiar character which originally formed and which continues to preserve it. The character of democracy creates democracy, and the character of oligarchy creates oligarchy; and always the better the character, the better the government.[3]

Thus education, its foundations, its strength and weakness, ought to be judged in relation to the society which it is called upon to serve. It is society which sets the goals which education follows. The important issue is how society does this, whether on the basis of pluralism or a single dictate by a group of rulers. The ultimate

[1] J. B. Conant, *The American High School Today*, New York: McGraw-Hill Book Co., Inc., 1959, p. xi.

[2] See W. W. Brickman, "A Course on Soviet Education," *School and Society*, vol. 86 (Nov. 8, 1958), 22–23; W. W. Brickman (ed.), *Teaching about Soviet Education*, New York: Society for the Advancement of Education, Inc., 1958. See also the series of articles on this topic in *Comparative Education Review* during 1958 and 1959.

[3] Aristotle, *Politics*, bk. VIII, ch. 2, p. 321 (Modern Library edition).

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question is, what are the goals and for what purpose are they set up. What is the role of the individual versus the state and society and what are their respective rights in education?

Education poses essentially the same problems in all societies, but the solutions adopted for them, as embodied in the respective educational systems, differ from one society to another, and are dependent upon the nature of the individual society and its goals. This means that the educational system of any country, if it is to be properly evaluated, must be examined and judged, not in a vacuum, but in the light of the particular goals of the society concerned and the institutional devices it employs.

Thus, in appraising education anywhere, and particularly in the Soviet Union, it becomes necessary at the outset to distinguish between four different aspects of the problem which often tend to become confused because of their interaction upon one another. The first involves the *professed aims* of education in the society concerned. In the Soviet Union, this means what the communist leaders, echoed by educators, proclaim to be the guiding principles and purposes of Soviet education. These are the ideals—a mixture of ideology, good intentions, and apocalyptic visions of the communist millenium. The second aspect—distinct from, yet influenced by, the first—embraces all facets of *actual educational practice,* i.e., the school system itself and how it operates. The third concerns the *actual results,* or end product, of the system as it functions in practice. Then, there is also a possible fourth and final aspect completing the chain of mutual interaction: it is the *reverse influence* of the observed educational end product upon either the ideal precepts or the actual practice of communist education, or perhaps upon both. All these aspects are of course essential to an overall picture of education in the U.S.S.R., but it is the fourth which has special pertinence to the process of change now taking place in Soviet educational policy and practice.

Soviet education, after two and a half decades of relative stability, is in the throes of far-reaching reform. Not since the beginning of the era of forced industrialization in 1929 has the educational system been subjected to so drastic an overhauling as we have been witnessing since 1958. On its face, the present reform is aimed primarily at the process of schooling, the structure of the primary and secondary schools, and to a somewhat lesser degree the system of secondary specialized and higher professional education. But the real significance of the transformation lies in something deeper than the mere revamping of the educational structure. It stems from the fact that the intent and probable impact of the reform appear to run counter to, and spell a reconsideration of, the fundamental principles of education which the Soviet communists have traditionally avowed.

The communist rulers of the U.S.S.R. have long proclaimed the constitutional right of Soviet citizens to education as one of their proudest achievements. This right was written into the original 1918 Constitution and was reaffirmed in the Great Stalin Constitution of 1936, which has since undergone many revisions. It was most recently redefined and reconfirmed on December 25, 1958, when the Supreme Soviet of the U.S.S.R. formally ratified the school reform law.

But it is not only the constitutional "guarantee" that the Soviet leaders cite in asserting the superiority of the communist concept of education. Even though Khrushchev himself initiated the criticisms of actual educational performance which led to the current reforms, he has been no less unequivocal than his predecessors—or than the original formulators of communist doctrine—in claiming that no other social system assures the citizen of "more" and "better" education than does the communist, either in its socialist stage of today or, much more of course, in tomorrow's promised era of the communist millenium. More specifically, the Soviet claim of superiority for the communist form of education rests on the argument that it is designed to play a unifying role by erasing the distinction between mental and physical labor, by combining productive labor with theoretical learning, and thus effecting the all-sided development of the individual up to the limits of his capacity. Such is the theoretical ideal, but its translation into practice is quite another and more difficult matter. As the sweeping reforms now underway attest, the central issue of how much weight to give to this or that specific type of education in

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order to achieve the goals of the regime has not yet been satisfactorily resolved.

It is worth noting here that the Soviet Constitution, while stipulating the right to education and naming the institutions charged with fulfilling it, fails to give any definition of education itself. This, however, is perhaps not so strange after all, if we consider that there is no broader, vaguer or more elastic concept than is encompassed in the term "education." The Russian language boasts three different words—*obrazovanie, prosveshchenie,* and *vospitanie*—all of which are indiscriminately translated in Russian-English language dictionaries by the single English equivalent, "education." Although there is some semantic ambiguity and overlapping in the usage of these Russian terms, it may be said that *obrazovanie* denotes education more in the sense of institutions and processes (*obucenie, prepodavanie*): it signifies schooling, training, learning, instruction, both in the abstract and in concrete form. *Prosveshchenie* has the much broader meaning of general enlightenment and goes beyond the formal educational process to take in cultural services and activities, recreation, and entertainment. Finally, *vospitanie* conveys the meaning of individual upbringing and the inculcation of moral and ethical values; hence it stresses the aspect of education that is concerned with bringing individual and social values into consonance. Soviet "education," then, embraces all these differentiated concepts. Having defined the scope of the area in which it functions, let us look more closely at what the system is designed to achieve.

The Basic Aims of Soviet Educational Policy

As stated at the outset, the purposes of education in any country are shaped by the nature of the particular society, by its cultural heritage and its political, economic and social institutions, and—to a greater or lesser extent—by the "world outlook" upon which the society is based.

In the United States, although the aims and philosophy of education have often been the subject of controversy, the basic ideal which has guided and molded the development of the educational system has been the principle that education is good only if it is primarily for the sake of the individual: that its mission is to teach the individual how to think and to act, how to develop and perform a skill of his own choosing and for his own benefit, within the bounds and restraints set by the democratic system and its laws. Thus, education in the United States is not nationally planned, but instead is in a constant and automatic process of adjustment to individual and social demand. Of course, automatic adjustment does not necessarily preclude some national educational planning, nor is it able to synchronize always and instantly the forces of supply and demand. Nevertheless, in a free society it is the individual who determines what kind of education he will seek, not the state which imposes its own choice on him. The educational process, instead of aiming to remold individual character, accepts human nature as it is, and is designed to bring out the best in it. All these educational principles stem from, and reflect, belief in democracy, in individual freedom, and in equality of opportunity—however imperfect and circumscribed by personal circumstances the last of these may be.

The basic aims of Soviet education are altogether different. The educational system is designed to serve, not the individual, but the collectivist state which, by identifying itself with the common good, subordinates the individual—his rights, privileges, choices, and his entire physical and mental training—to its own needs. It is only within the confines of choice determined by the state that the individual may develop his personal abilities. This substitution of the concept of service to the state for the concept of individual benefit constitutes the fundamental distinguishing characteristic of Soviet educational philosophy and practice.

In line with this concept, communist education sets itself a much broader task than mere instruction. It not only aims at providing the youth of the country with those kinds of knowledge and skills that will be most useful to the state, but also seeks to remold the character of the individual and inculcate a uniform pattern of prescribed beliefs, attitudes, sentiments, and values consonant with communist ideology. This latter, more ambitious aim—often

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described as an effort to create the "new Soviet man"—has received so much emphasis outside the Soviet Union that it has become quite fashionable to view the Soviet educational system solely as an effective instrument of totalitarian thought control. Such a one-sided view, however, is an erroneous oversimplification, and it impedes an accurate assessment of the problems of Soviet education, especially in those areas relating to the training of specialized and professional personnel.

This is not to deny either the importance or the effectiveness of the role that education has played in the U.S.S.R. as an indoctrinational weapon, although one may question whether it has produced—or can continue to assure in the future—the absolute, monolithic ideological conformity claimed by Soviet propaganda. No one, certainly, would dispute the mass of evidence showing the many totalitarian features of the Soviet educational system: its subjection to rigid, centralized planning and direction by state organs which themselves are mere enforcing agents of party policy; thoroughgoing control over teachers, school curricula, textbooks, and study materials, even extracurricular student activities, ensuring not only that educational institutions will actively propagate communist ideology, but that nothing challenging to the ideology or the official party interpretations of fact will be taught. But it must be obvious that, if Soviet education were nothing more than a highly perfected mechanism of ideological indoctrination, the Soviet Union would hardly be the modern industrial power that it is today, and there would be no need for the present study. In reality, the situation is far more complex.

A more realistic appraisal cannot fail to recognize that Soviet educational policy, however strong its ideological orientation, has also responded to exceedingly pragmatic considerations. While Soviet education undoubtedly involves an element of coercion—sometimes moderate, sometimes openly ruthless—to compel conformity with party dogma, there is also quite a practical approach to the problem of training personnel for an economy undergoing rapid industrialization and for a social mechanism permeated by bureaucratic structures. In such a system, mere ideological conformity is not enough; professional competence and technical know-how are also necessary. The character and kind of training are determined by the obvious necessity of providing an adequate supply of various types of trained manpower—scientists, engineers, managers, teachers, supporting personnel, skilled labor. These must be supplied regardless of whether the individuals have been thoroughly indoctrinated ideologically or may only outwardly have embraced communist dogma.

Needless to say, Soviet industrial expansion and the development of a complex new technology have—just as in other industrial countries—enormously complicated the problems of education, more especially of achieving a proper balance between education as a means of molding social and political values and education as a service tool for the attainment of economic production goals. In order to meet the growing demand for specialized and skilled manpower, Soviet educational policy at all levels has tended to place increasing stress on the expansion of those types of training which equip the individual with specific, vocational, technical, and scientific skills enabling him to perform certain specialized or professional functions in the national productive effort. In other words, the practical needs of the economy have caused a more pronounced shift towards *functional* education, with usefulness for the performance of productive tasks becoming the dominant criterion of the type, extent, and quality of education the individual should receive.

This trend toward functional education has, however, had an unexpected consequence: it has brought to light a fundamental conflict, in Soviet educational practice, between hallowed Marxist precepts of education and the contending force of present-day economic realities. Well over a century ago, Marx propounded the principle that education in a communist society should combine academic instruction with material production—that productive physical labor should be an integral part of the educational process along with book learning—with the central objectives of uniting theory and practice and eliminating all distinction between mental and physical labor. Functional education, as it is now embodied in the Soviet system of polytechnical training, was supposedly based upon these fundamental precepts, and com-

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munist theoreticians have consistently represented it as the most appropriate means of achieving the objectives laid down by Marx. However, with the advance of technology and the increasing complexity of the industrial process, requiring a vast number of highly specialized skills, it has become evident that functional education operates against rather than toward Marx's objectives. That is, if functional education is to keep pace with technological progress, it must necessarily provide more and more specialized types of training which further the division of labor. In so doing, it negates the Marxist ideal of a well-rounded education aimed at eliminating the division between mental and manual labor.

Despite the conflict between theory and actual Soviet practice as dictated by hard economic reality, Soviet official spokesmen have continued to pay lipservice to the old Marxist ideals. Indeed the theses of the Central Committee of the Communist Party of the Soviet Union which outlined the 1958 program of educational reform reaffirmed those ideals once again in declaring:

> The Soviet school is called upon to prepare well-rounded, educated individuals who have mastered the foundations of knowledge and who at the same time are capable of systematic physical labor, to instill in the young the desire to be useful to society and to take an active part in producing the values society needs.[4]

Thus the theses of the Central Committee hewed to the theory that the task of education is a unifying one: to nurture in every individual both academic knowledge and the capacity to perform manual labor skills, thereby realizing the Marxist goal of "complete unity of mental and physical labor." [5] But even as it reaffirmed the Marxist ideal of balanced education, the theses prescribed reforms which will tip the balance sharply in favor of skilled labor training.

The utilitarian element in Soviet education is of course nothing new, but the preponderant place now given to it stands in sharp contrast to the previous subordination of utilitarian labor training to formal academic instruction. For some 25 years, the guiding directive for Soviet education was the 1931 decree of the party Central Committee, which stated that "the combination of learning and productive labor is to be based on the principle that the entire social and productive labor of the pupil is completely subordinate to the process of learning and upbringing, which is the major task of the school." [6] Now, on the contrary, the development of productive skills and direct participation by students in production are assigned first importance. In rationalizing this on Marxist grounds, some Soviet educational authorities have alleged that the earlier policy "erroneously identified" the mere acquisition of academic knowledge "with the all-sided development of the individual," and they contend that this objective will in fact be more effectively realized through increased emphasis on labor training and general integration of the school into diversified vocational training and production activities.[7]

Fundamentally, the dilemma of Soviet education today stems from the difficulty, if not impossibility, of reconciling the requirements of socioeconomic planning with the professed educational ideals of communism. One of the basic theorems of Marxism is that the laws of any organized society must necessarily reflect the *objective* conditions prevailing in it. Therefore, Soviet ideologists have argued that the constitutional guarantee of the educational right of Soviet citizens, and the laws implementing it, reflected the actual existence in the U.S.S.R. of objective factors—economic resources, teachers, educational facilities, etc.—permitting every citizen to obtain an education of his own choosing up to the full limit of his intellectual capacity. Only in a socialist society, they maintained, did such socioeconomic preconditions exist; and their existence in the Soviet Union made the educational goal stipulated in the constitution fully attainable.

The wide gap between these claims and

[4] *Pravda*, Nov. 16, 1958.
[5] *Idem.*

[6] Editorial in *Narodnoe obrazovanie* (Public Education), No. 10, October 1955, p. 10; Deineko, *Spravochnik*, p. 20. Curiously enough, the 1931 decree, which served as the basis for deemphasizing polytechnical instruction in the 1930's, later came to be interpreted—even as recently as 1956—as the basis for *introducing* polytechnism!

[7] N. Goncharov and A. Leont'ev, "Diferintsirovat' obuchenie na vtorom etape srednego obrazovaniia" (Education in the Second Stage of Secondary Education Should Be Differentiated), *Pravda*, Nov. 21, 1958. Academician Goncharov is Vice President of the Academy of Pedagogical Sciences of the RSFSR and his coauthor is a member of its Presidium.

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the real situation was clearly brought out by the recent debate on the educational reform program.[8] But even if the necessary preconditions existed for extending full and unrestricted opportunity of educational development to every individual citizen, the fact is that this could not possibly be done without contradicting another fundamental tenet of communist doctrine—namely, that a socialist society is a *planned* society and, as such, operates a planned economy requiring, in turn, a certain desired or optimal combination of human skills. It follows that Soviet planners are not free to permit every citizen to exercise fully his educational "right" and must circumscribe it by restraints dictated by economic planning requirements. These restraints are part and parcel of the Soviet educational system with its regulation of training programs, of types of specialization, of enrollment quotas and so on—all designed to produce an adequate supply of the specific kinds of skilled and professional manpower demanded by the economic plan. Hence, the essential function of Soviet educational planning is to set up a scale of preference for the various types of specialized labor training, based on the economic plan, and to assure that the proper proportion of qualified student material is channeled into each. This means that the student's right to the kind of education best suited to his individual talents and taste can, in fact, be exercised only when his inclinations conform to the planners' preferences.

Another vital aspect of the Soviet educational dilemma, and one which figured importantly in bringing about the 1958 reforms, concerns the role which education has played in the U.S.S.R. as a factor making for social stratification.[9] Contrary to the Marxist vision of growing egalitarianism on the road to communism, Soviet policy over the last 40 years has, in effect, elevated the principle of differential rewards to the status of an immutable law of socialism: "from each according to his ability, to each according to his work." Moreover, individual educational achievement inevitably became an important criterion for determining the level of "work" and hence of rewards, in terms of both money and social status, to which the individual was entitled. Education thus became a vital means of individual advancement, and severe competition developed for the opportunity to continue one's schooling to the highest possible level. It was in this way that the new class dubbed "the new Soviet intelligentsia" came into being. Since, moreover, opportunities for acquiring higher education tended to become restricted to children of the already privileged, education became a factor contributing to the perpetuation and accentuation of social inequality.

This sort of development is difficult to avoid as long as education remains a scarce commodity, but as the gap between educational supply and demand narrows, the importance of educational attainment as one of the means of individual advancement or upward social mobility tends to diminish. In the Soviet Union, a relative scarcity of educational facilities persisted through the early 1950's, with the result that not merely professional training, but even secondary education and specialized vocational training were enough to assure their possessors an improved status and a higher level of rewards. By the mid-1950's, however, conditions of relative educational scarcity were beginning to give way to conditions of relative educational plenty, and as a consequence there was the start of a decline in the importance of academic achievement alone as a determinant of social status and level of reward. One of the purposes of the 1958 reforms is to adjust the Soviet educational system to these altered conditions. The reform program seeks to accomplish this by placing sharply increased emphasis on the labor content of education, and by making the capacity to perform skilled productive tasks, instead of academic proficiency alone, a criterion of the individual's level of achievement.

Soviet writers have hailed the reform program as a move "to return Soviet schools to the only

[8] Cf. G. Z. F. Bereday, W. W. Brickman, and G. H. Read (eds.), *The Changing Soviet School*, Boston: Houghton Mifflin Company, 1960, especially pp. 12–20.

[9] See E. Koutaissoff, "Soviet Education and the New Man," *Soviet Studies*, vol. V, No. 2 (October 1953), 122–123; R. A. Feldmesser, "The Persistence of Status Advantages in Soviet Russia," *The American Journal of Sociology*, vol. LIX, No. 1 (July 1953), 19–27; R. A. Feldmesser, "Equality and Inequality under Khrushchev," *Problems of Communism*, vol. IX, No. 2 (March-April 1960), 31–39; G. Z. F. Bereday, "Class Tensions in Soviet Education," in G. Z. F. Bereday and J. Pennar (eds.), *The Politics of Soviet Education*, New York: Frederick A. Praeger, 1960, pp. 57–88.

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correct path—the path of the labor education of youth"—as charted by Lenin in the early years of the regime. They state that, because the necessary resources for true polytechnical education were lacking at that time (the 1930's and 1940's), the schools departed from the Leninist path and were "diverted into the straitjacket of academic work," with the consequence that the student was "taught . . . to think that people like himself were destined only for higher education and for the higher professions." Those who completed higher education and went on to obtain a graduate degree considered "that they had attained the ultimate in life" and expected job promotions and other rewards solely on the strength of their diplomas and degrees. It is added, however, that under the reform program, "all this will come to an end. . . . The school will return to its proper path as charted many years ago by Lenin. It will be made a true school for labor. The students will be made to work. People will be educated to love work and to know how to work." [10]

With these objectives in mind, the cardinal problem remains as to how to achieve labor-oriented schooling for the masses without sacrificing altogether the essential academic preparation of the relatively small number of persons required by the socioeconomic plan to be trained for advanced professional tasks. It is concerning this problem that ideal educational precepts offer few solutions, and the actual educational practices in the Soviet Union must be considered in detail.

The Debate on Educational Reform

The Soviet Government organ *Izvestia* remarked on July 28, 1958, that "there has not been a more exciting discussion in many years than is now going on about our schools." If anything, this was an understatement, for the Soviet Union had in fact seldom witnessed such a frank, extensive airing of problems in a vital area of public policy as took place in the 1958 debate on the reform of Soviet education. The debate was, of course, inspired and led by the party leadership and government, which used it as a forum for stressing the urgent need of reform, for advancing specific reform proposals, and in general laying the groundwork for the projected reorientation of the educational system.

The central problems involved in the debate, however, were not essentially new, although the solutions advocated by the regime and eventually embodied in the school reform law were more drastic than anything contemplated in the past. In order to place the developments of 1958 in proper perspective, therefore, it is necessary to view them against the background of the readjustments that had been going on in Soviet education since just before the close of the Stalin era.

1. *Background of the 1958 Debate*

It was Stalin's last writing which foresaw the need for undertaking educational changes.[11] The principal issues at stake in 1958 were foreshadowed by Stalin's dictum incorporated in the decision of the 19th Party Congress in October 1952 to effect a gradual transition to "universal polytechnical education." [12] Such a transition was viewed as essential for attaining universal and compulsory education, which would, according to Stalin, allow each graduate "freedom in choosing an occupation." The decision to introduce universal education of the polytechnical type, in effect, launched the initial stage of the piecemeal readjustment of the Soviet general education school.

In 1954–55, the directives of the Congress were implemented by the introduction of manual labor and shopwork in the lower school grades (1–4); and in 1955–56, by the inauguration of shop and agricultural fieldwork in the intermediate grades (5–7) and of various practice work assignments in the upper grades (8–10).[13] Actual adjustment of the school program in line with these changes was slow, however, and it was not until June 1955, more than 2½ years after the 19th Congress, that a revised

[10] N. Dobov, "Deistvitel'no trudovaia shkola" (The True Labor School), *Novyi mir* (New World), January 1959, pp. 25–27.

[11] I. Stalin, *Ekonomicheskie problemy sotsializma* (Economic Problems of Socialism), Moscow, 1952, p. 68.

[12] Deineko, *Spravochnik*, p. 186.

[13] *Uchitel'skaia gazeta*, Sept. 17, 1955, contains a comprehensive discussion of the changes in the school program during the years 1952–55.

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program was finally announced.[14] Moreover, the modifications that were introduced did not go sufficiently far to alter the preponderantly academic and theoretical orientation of the school program.

During the 1953–55 period, a number of educational conferences were held, at which not only the adjustment of the school curriculum and of instructional methods but also other problems of a more general nature were discussed. In particular, a conference in the summer of 1955 broached the problem of discipline in the schools and pointed to "poor education" in the area of ethics and ideology as a cause of "low labor productivity, drunkenness, apolitical attitudes, passivity toward social action, and lack of ideological orientation." A large share of the blame was also fixed upon parents "who often inculcate a denigrating attitude toward labor, the school, and the teacher, and [who] stimulate coarse behavior and outright immoral acts on the part of their children." [15] As a corrective, the conference recommended a strengthening of labor education in the schools, as well as administrative penalties against offending parents.

At the historic 20th Party Congress in February 1956, which saw the denunciation of Stalin's crimes, Khrushchev himself indicted Soviet schools for failing to give pupils "sufficient preparation for practical activity." [16] His criticism was echoed by other spokesmen at the Congress, who charged that the goal of polytechnization of education, decided by the 19th Congress, was still not being properly implemented. No suggestion was made for abandoning the existing 10-year system of schooling, but the Congress did decide in favor of changing the content of general 10-year education so that, by 1960, it would be such as to enable all students to enter gainful employment immediately upon graduation. Accordingly, in May 1956, there was a further "experimental" revision of the school program along more pronounced vocational lines. The experimental program provided for stepped-up manual training in grades 3–4, for the addition of spring and fall practice work in grades 5–6, and for summertime work assignments of 3 to 5 weeks' duration in between grades 8 and 9, and 9 and 10. The program was applied in only about 500 schools in the 1956–57 school year, but in 1957–58 it was extended to about one-fourth of all the schools.[17]

One effect of the revised program was to increase total hours of "instruction" received by students during their 10 years of regular schooling by about 1,000—from 9,670 to 10,653 hours. This "overburdening" of the students evoked considerable criticism, and it was consequently decided in September 1956 to abolish final promotion examinations in grades 5, 6, 8, and 9, making available the time saved to be devoted to "practice" work assignments and excursions. In April 1957, assignments to summertime work (especially in rural areas) were made compulsory for pupils in grades 5, 6, 8, and 9, even in schools which were not yet operating under the 1956 experimental program. This was followed by an announcement in December 1957 that the Russian Republic would establish 50 experimental schools which would have 11- and 12-year programs and would require students in the upper grades to attend classes 3 days and work 3 days per week.[18] Another innovation in the years 1956–58 was the introduction in some schools, particularly in the Ukraine, of elective courses designed to develop vocational or trade skills, ranging from lathe operation and tractor driving to sewing and home economics.[19]

The prime objective of all these piecemeal adjustments and experimental projects was to inject a priority emphasis on diversified vocational and labor training into the hitherto uniform, academically oriented system of schooling. Even before the end of 1956, however, the view was being openly voiced in some Soviet educational circles that the piecemeal, "makeshift" approach was inadequate to bring about a satisfactory, long-term solution of the problem.

[14] *Ibid.*, June 22, 1955.

[15] *Ibid.*, Aug. 17, 1955 (article by I. A. Kairov, then Minister of Education of the RSFSR).

[16] Report of the Central Committee, delivered by N. S. Khrushchev at the 20th Congress of the CPSU, reported in *Pravda*, Feb. 15, 1956; or see published pamphlet, *Otchetnyi doklad TsK . . .* (Report of the Central Committee . . .), Moscow, 1956, p. 94.

[17] *APS–NarObr–1957*, pp. 93–95.

[18] See especially a report concerning a conference of the heads of these experimental schools, in *Narodnoe obrazovanie*, No. 12, 1957, pp. 119–121.

[19] "Vazhnyi vopros" (The Important Question), *Kommunist* (U.S.S.R.), No. 5, vol. 35 (April 1958), pp. 119–124.

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This view was forcefully expressed by a group of prominent Leningrad educators and writers in a published article in December 1956, which declared:

The Ministry of Education [of the Russian SFSR] reacts peculiarly in dealing with the problems before them. . . . Year after year they just search for the solution. . . . So far their search has failed. . . . The representatives of the Ministry of Education, it appears to us, do not themselves know what kind of new program is really needed. The programs which they devise are not serious; they do not represent a thoroughly considered plan worked out in proper perspective; they deal with day-to-day shortcomings on a makeshift, short-run basis only.[20]

It was in this article that, for the first time, the suggestion was broached to *shorten* the term of compulsory general education from 10 years to 7, upon completion of which students (14-year-olds) should be required to decide their "vocation in life" and, on that basis, be assigned to one of three differentiated "tracks" of secondary schooling—humanities, industrial arts, and biology. The article argued that multitrack secondary schooling was needed because most students could not continue beyond secondary school owing to the bottleneck in admissions to higher education. While advocating that the student's "preference" be the basis of his assignment to a certain type of secondary schooling, the article stressed that what was most needed was specialized training to develop the middle and lower-level work skills. This, the authors stated, was where the existing educational system was deficient, and the time had come to resolve this "thorny problem."

The "thorny problem" was that educational authorities continued to single out the general 10-year school as a separate unit. They proceeded to try to adjust it without destroying its earlier orientation. The fact was that for nearly three decades the Soviet educational system had been based on the principle of "unified" and "uniform" schooling for all. The idea of a unified school emerged in the 1920's and uniformity was imposed in the 1930's. Ideally, the social need was to be satisfied by a comprehensive school which would offer diversity of instruction to suit all needs. In reality, however, it meant standard academic education for all, regardless of ability or preference. Up until as recently as 1955, Soviet educators had been virtually unanimous in asserting the indispensable value of the principle of standard schooling.[21]

The vocational schools in the State Labor Reserve system, the semiprofessional schools, and higher educational establishments made up a network of specialized educational facilities in which diversity was considered justified, and which therefore remained outside the scope of the drive for uniformity. There was firm insistence, however, upon keeping the 10-year general education school and its subdivisions uniform for all students. Although adjustments were made in the school program to conform to the decisions of the 19th and 20th Party Congresses, these merely deemphasized without reversing its academic orientation, and the insistence of the educational authorities on uniform 10-year general schooling continued to present a major obstacle to decisive change.

Interestingly enough, the cult of Stalin has been blamed—as it has for many other things—for the past deficiencies of Soviet schooling in imparting to students only "theoretical and formal knowledge," and the demand for a return to "true" Leninist principles of education has run like a thread through the entire debate on educational policy since the mid-1950's. Thus, a Soviet educational journal declared editorially in November 1956:

Many fundamental problems such as the abolition of workshop activities, the curtailment of coeducation, and many others were resolved without any consultation with pedagogues; and these measures were never criticized or questioned, for their introduction was associated with the name of Joseph Stalin. Only now, when the party has embarked upon a resolute struggle against the cult of personality and its consequences, have the necessary conditions been created for solving the problem of polytechnical education and uniting education with the productive work of pupils . . . which will permit the restoration in practice of the full force of Lenin's directives on education.[22]

Apparently spurred by the criticisms of "make-

[20] B. Anan'ev *et al.*, "Kakaia nam nuzhna shkola?" (What Kind of School Do We Need?), *Literaturnaia gazeta*, Dec. 1, 1956. In its preceding issue of Nov. 20, the same journal had published another article entitled "What Worries 17-Year-Olds?" which pointed out that 10-year-school graduates, most of whom could not realize their hopes of continuing their education, were having a hard time finding a place in society because they had to take jobs for which they were totally unprepared.

[21] *Medynskii—1955*, p. 14.

[22] *Narodnoe obrazovanie*, No. 11, November 1956, p. 6.

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shift" attempts to resolve educational problems, the Academy of Pedagogical Sciences of the RSFSR early in 1957 began deliberations for the purpose of working out a systematic, long-range plan for reform of the Soviet school. Out of these deliberations came proposals for a 15- to 20-year plan of educational development, which promptly evoked wide discussion among Soviet educators. The chief innovation of the plan was that it called for an end to uniform secondary schooling: specifically, it envisaged a 12-year system of education for all children aged 6 to 18, with the first 8 years to consist of compulsory, uniform education, and the last 4 years of diversified schooling under a system of "furcation" (*furkatsiia*), or several parallel tracks of secondary education.[23]

The effect of the plan would thus have been to reduce the period of uniform general education from 10 to 8 years, the lowering of the age of entry from 7 to 6 making the terminal age 14, or the same as for existing 7-year schooling. Hence it was also tantamount to converting the 7-year into an 8-year school. With regard to the multitrack or furcation system to be applied in the upper (9–12) grades of the proposed 12-year school, the plan recommended starting with three profiles: (1) physics-mathematics and technical; (2) biology and agricultural; and (3) socioeconomic and humanities. It also envisaged the possibility of further specialization within these profiles through the introduction of electives or supplemental courses. Thus, the principle of diversified education, long denounced in the Soviet Union as a "bourgeois device" for giving inferior education to the masses of toilers,[24] was advocated as an acceptable, positive concept, although by some sort of semantic wizardry the proposed system was still represented as being consistent with the communist ideal of educational "uniformity."

The first ostensible move toward implementing this proposed long-range plan was taken at the end of 1957 with the establishment in the Russian Republic of the 50 experimental schools mentioned earlier. The RSFSR Ministry of Education, moreover, in the spring of 1958, categorically endorsed the principle of diversified secondary schooling and announced its intention "to apply maximum speed in developing several types of schools." [25] In fact, however, the programs instituted in the experimental schools did not apply the principle of furcation, but were oriented instead toward straight vocational training in the upper grades through part-time instruction and part-time work. Goncharov and his colleagues in the Academy of Pedagogical Sciences nevertheless continued to press for a system of multitrack secondary education even after their proposed educational development program lost out in the course of the 1958 debate.[26]

2. *The Key Issue of the 1958 Debate: Labor Education in the Secondary School*

By the spring of 1958, then, there was already a definite trend in the direction of reorienting the educational system so as to place heavier emphasis on the cultivation of practical labor skills, but there was as yet no clear consensus among Soviet educators as to precisely how this should be done, and to what extent it should involve a sacrifice of academic schooling. The party leadership then decided to force the issue. In April, on the heels of a report that the party Central Committee was actively considering the educational problem, Premier Khrushchev seized the occasion of his address to the 13th Congress of the Komsomol (Communist Youth League) to deliver a scathing attack on the continuing deficiencies of Soviet education.

Curiously enough, just 10 days before Khrushchev's address, a major Soviet newspaper had published an article which sharply criticized tendencies in the schools to "confuse" manual labor training with true polytechnical education, and clearly implied that it was a mistake to make such training the task of the upper grades of the general education school. The article declared:

> A clear conception is lacking as to what polytechnization is. . . . The schools often take it to mean that the pupils should make all sorts of things and gadgets during instruction periods in manual workshops. . . . It seems [however] that

[23] N. K. Goncharov, "O perspektivnom plane razvitiia narodnogo obrazovaniia v SSSR na blizhaishie 15–20 let" (Prospective Plan for the Development of Public Education in the U.S.S.R. in the Course of the Next 15–20 Years), *Sovetskaia pedagogika*, No. 4, 1957, pp. 10–25.

[24] See "*Furkatsiia*" in *BSE–2d*, vol. 45, p. 661.

[25] *Uchitel'skaia gazeta*, Apr. 26, 1958.

[26] Article by Goncharov in *Pravda*, Nov. 21, 1958.

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polytechnical education ought to mean the study in both theory and practice of the fundamentals of production. . . . The manual workshops should have an applied secondary rather than a major leading role. . . . Of course, the schools should train pupils in a vocational skill. . . . But there is a wide difference of opinion about this. . . . Should the Ministry of Education enter the business of training skilled workers? Why is it that all the proposals on polytechnization which are being talked about neglect to take into account the existing technicums, trade schools, FZO schools, etc. . . . [and] insist upon the conversion of grades 8–10 to vocational and technical training outlets . . . ?[27]

In his Komsomol speech, however, Khrushchev assailed the educational system from quite the opposite point of view. Hardly even touching upon the subject of polytechnical education, he left no doubt that he considered the primary task of Soviet schools to give practical *labor training*. Thus the concept of polytechnical education as many-sided preparation in all branches of industrial production was altered to mean training in a single branch of production and even further limited to the acquisition of one specific laboring skill within a given industry. "In the work of our schools and higher educational institutions," Khrushchev declared, "there are fundamental shortcomings . . . . We cannot go on like this . . . . The time has come to reshape radically the entire system of education for our school youth." As to what these shortcomings were, Khrushchev asserted that the Soviet school was "separated from life . . . and production"; that it was "not suited to offer practical education" and did not prepare youth for useful labor; that it failed to educate youth morally and to "inculcate the deepest respect for the fundamental principles of socialist society," which required that each individual should live by the fruits of his own labor. Instead, he charged, the schools were breeding loafers who express "lordly contempt for labor" and "live at the expense of those who create material and intellectual wealth."[28]

Khrushchev's unprecedented public indictment of Soviet education had the immediate effect of injecting a new note of urgency into the hitherto spasmodic discussions of school reform. The party Central Committees in a number of constituent republics quickly convened plenary sessions which set up "special commissions" to study means of improving education at all levels. During the next several months, both the central and local Soviet press as well as periodicals published hundreds of statements and articles by officials, educators, and others, all bearing on the problem of educational reform and most of them deprecating grossly the past educational practices.

It should be noted that in the Soviet setting, words of scathing criticism are used themselves as a weapon to change the attitudes of the Soviet people. But in evaluating the reform intelligently, we must give more weight to the objective factors—namely, the strongly shifting relationship between the demand and supply of personnel of different levels of skill. In the 1930's the demand for semiprofessional and professional personnel with specialized training exceeded the supply, and the philosophy of education was to encourage people to seek advanced academic training. The supply of ordinary labor was relatively abundant. In the late 1950's, however, when the educational system had provided the necessary pool of academically trained secondary school graduates, the demand for people with such education was oversatisfied.

The reform, therefore, was partly designed to correct the imbalance that would have become serious if prereform trends in the output of secondary school graduates with academic preparation only had been allowed to continue. What was needed now were more people to support the adequate supply of highly skilled specialists. In the Soviet Union the problem developed on short notice because of the demographic changes (see discussion below) which have taken place in recent years, and the solution of "price mechanism," which is resorted to in other economics, could not be relied upon as it would have been too slow.

Until recently, the Soviet educational system was adjusted reasonably well to turning out people with various degrees of skill and education to fit economic demands. The general problem in the late 1950's was not how the supply and demand between engineers and lawyers were to be controlled, because this has always been done through a quota system, but rather how the proper balance between the

[27] *Sovetskaia Rossiia*, Apr. 8, 1958.
[28] *Pravda*, Apr. 19, 1958.

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higher and lower skills could be attained. The educational system had to be adjusted to these shifting conditions. Thus the dramatic language condemning past educational practices merely underscored the urgency with which the Soviet planners sought an immediate solution of the problem.

It is understandable therefore that the whole debate revolved around the central issue of labor education and the extent to which regular academic schooling should be curtailed or modified in order to accelerate the preparation of Soviet youth to fill productive jobs in the economy. The lines of contention were clearly drawn between two opposing viewpoints: on the one hand, the insistence of the party leadership and economic planning authorities—seconded by government officials concerned with educational administration—that both the duration and content of general schooling be revised so that, upon its completion at age 15, students could immediately be drawn into productive work; and, on the other hand, the contention of Soviet professional educators that a cutback of general schooling from 10 to 8 years would be retrogressive, and that a more appropriate method of improving labor training without unduly sacrificing academic education would be to introduce diversified schooling at the secondary grade level.[29]

It soon became apparent that the official stand in regard to school reform was decisively influenced by the production targets that were being formulated for the first Soviet Seven-Year Plan. Near the end of August 1958, G. Zelenko, head of the Main Administration of the State Labor Reserve, announced that his agency had prepared a survey of the prospective requirements for skilled and semiskilled labor during the Seven-Year Plan period (1959–65), and that these requirements dictated an intensification of vocational and labor reserve training as the major task of the educational system.[30] Two weeks later, in another published statement, Zelenko asserted that even though Soviet educators did not seem to realize it, secondary education had "outlived" its usefulness, and the primary objective of educational reform should be to start the training of young workers in an expanded system of vocational schools and on the job.[31]

Educators of the Academy of Pedagogical Sciences were quick to react to Zelenko's contentions. The head of the Academy, I. A. Kairov, advocated a new version of diversified secondary education, to be accomplished through the establishment of different types of secondary schools complementing one another.[32] Another Academy spokesman criticized Zelenko's stand as tantamount to advocating "complete abolition of the secondary school as an institution."[33] This was essentially true, although Zelenko had mentioned the possibility of further schooling for students especially gifted in mathematics, physics, and the natural sciences, and in the arts (music, ballet, painting, etc.), and had also suggested part-time schooling (evening classes and extension-correspondence courses) as the most suitable overall substitute for the existing system of secondary education.

The outcome of the clash between these opposing viewpoints was, of course, a foregone conclusion. In September Khrushchev's memorandum on education reform—entitled "On Strengthening the Ties between School and Life and on the Further Development of Public Education"—was formally approved by the Central Committee Presidium and published.[34] The memorandum again condemned the existing school system in terms almost identical with those of Khrushchev's April address to the Komsomol Congress and reiterated that the imperative aim of educational reform must be to assure effective labor training. In November, a thesis embodying the gist of the memorandum and bearing the same title was jointly issued by the party Central Committee and the U.S.S.R. Council of Ministers,[35] almost simultaneously with the announcement of the proposed production targets of the Seven-Year

[29] One of the most comprehensive discussions of the prereform school structure and how it should be altered may be found in P. Rudnev, "K voprosu ob uluchshenii sistemy shkol'nogo obrazovaniia (v poriadke obsuzhdeniia)" (Concerning the Problem of Improving the System of School Education [A Discussion]), *Narodnoe obrazovanie*, No. 7, July 1958, pp. 13–29.

[30] *Pravda*, Aug. 26, 1958.

[31] *Komsomol'skaia pravda*, Sept. 10, 1958.

[32] I. A. Kairov, "Nazrevshie voprosy narodnogo obrazovaniia" (The Pressing Problem of Public Education), *Pravda*, Sept. 6, 1958.

[33] A. Arsen'ev, "Puti srednego obrazovaniia" (The Paths of Secondary Education), *Komsomol'skaia pravda*, Sept. 17, 1958.

[34] *Pravda*, Sept. 21, 1958.

[35] *Ibid.*, Nov. 16, 1958.

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Plan.[36] In December Khrushchev's reform proposals, with some minor changes, were unanimously ratified by the Supreme Soviet of the U.S.S.R., and implementary legislation was enacted by the 15 union republics in the spring of 1959, with the process of implemention to extend through the early 1960's.

It should be noted that while the 1958 debate centered largely on the reform of secondary education, its reverberations were felt in the realm of higher education as well. Immediately after the publication of Khrushchev's memorandum, officials concerned with higher education held a conference in Moscow during September 22–24 in order to discuss means of implementing the principle of "a closer tie between education and life" in their area also. Provisions for active student participation in productive work and for greater emphasis on industrial research and development in the programs of higher educational establishments were among the main topics discussed.[37]

Thus, it is abundantly clear that the driving force behind the current reforms in Soviet education is supplied by the regime's goals of continued, rapid expansion of the national economic power. This is explicitly acknowledged by Soviet educational authorities themselves, as for example by V. N. Stoletov, RSFSR Minister of Higher and Secondary Specialized Education and former Deputy Minister of Higher Education of the U.S.S.R., who stated in August 1959 that "the system of education should provide the national economy with cadres in requisite numbers and with the necessary qualifications to enable the economy to develop in full accordance with the Seven-Year Plan." [38]

The Soviet authorities have, on the other hand, been extremely reluctant to admit that the program of educational reform was influenced—perhaps decisively—by a further factor, namely the imminent prospect of a seriously reduced flow of new manpower into the economy as a consequence of the demographic trends set in motion by the staggering human losses (over 40 million) suffered by the Soviet Union during World War II. These trends and their effects on postwar school enrollments for different age groups, and hence on the supply of new labor, will be examined in detail in another section of this chapter and in chapter II. Suffice it to say here that, as a result of the wartime manpower losses and the consequent drop in the birth rate, the Soviet Union faced the prospect of a serious deficit in the annual flow of 18-year-old school graduates into the active labor force during most of the 1960's. In fact, the size of the 18–25-year-old age group in this period will be at least one-third smaller than it would normally have been.

Soviet economic planners have, indeed, recognized that this will pose a problem in achieving the goals of the Seven-Year Plan. In a 1959 official study dealing with the work of the regional economic councils, the section concerned with labor problems stated:

> It should be taken into account that during the period 1959–65 the national increment of labor resources will be considerably reduced because the age group of youths born during the war years will then be coming into the active labor force. Therefore, in certain regions of the country difficulties will emerge with regard to the supply of labor.[39]

At the same time, however, the Soviet leadership has denied any connection between this problem and the current reform of the educational system. In his opening speech at the Extraordinary 21st Party Congress in January 1959, Khrushchev caustically stated:

> When we raised the question of the reorganization of the schools, some prophets abroad began to shout: "They don't have enough labor, and therefore they want to integrate youth into the labor force." Let these prophets caw like crows, for they will never understand us. We are reorganizing the school not because we do not have an adequate work force, but because we want to improve the matter of the people's education and to establish a closer link between the school and life.[40]

[36] "Target Figures for the Development of the National Economy of the U.S.S.R., 1959–1965," *Pravda*, Nov. 14, 1958. It is significant that this announcement contained a section specifically dealing with the educational reform, as well as several references to it elsewhere in the text.

[37] *Sovetskaia Rossiia*, Sept. 25, 1958; *Pravda*, Sept. 23, 1958.

[38] *Pravda*, Aug. 26, 1959.

[39] E. S. Rusanov, "Sovnarkhozy i nekotorye voprosy ispol'zovaniia trudovykh resursov" (Regional Economic Councils and Some Problems of Utilization of Labor Resources), *in* Akademiia Obshchestvennykh Nauk pri TsK KPSS (Academy of the Social Sciences of the Central Committee of the Communist Party of the Soviet Union), A. G. Kulikov (ed.), *Iz opyta raboty sovnarkhozov i razvitiia khoziaistva raionov* (The Experiences of Work of the Regional Economic Councils and the Development of the Economies of the Regions), Moscow, 1959, p. 224.

[40] *Pravda*, Jan. 28, 1959.

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The very tone of this denial is enough to make it suspect. Moreover, to pretend that the knowledge of an impending decline in the supply of new labor in no way influenced the educational reform is virtually to deny that the Soviet Union has any socioeconomic planning at all. Above all, it is belied by the plain fact that the most important practical effect of the reform measures is to permit the integration of the bulk of Soviet youth into the active labor force at an earlier age (15) by cutting short, for the majority, the period of regular full-time (day) schooling and substituting, thereafter, part-time schooling and on-the-job training.

The two distinct problems which the reform had to face up to were how many, and how, people were to be educated. The first of these turned out to be the more important. The fact is that it was not until around 1952 that enrollment in grades 8–10 exceeded the prewar level, and the expansion intensified through the mid-1950's. It was the sudden and substantial surge of these people into grades 8–10 that brought into focus the prospect of excessive numbers pressing toward higher education at a time when the number who normally would be expected to go to work after the 7th grade was beginning to fall off.

The only puzzling question is why was the effect of this situation not foreseen, or, if foreseen, why was a deliberate effort still made to increase enrollment in grades 8–10? There seem to be two opposing answers. It may have been a case of bad planning or indecision, in which case the longer the solution was put off the more drastic the ultimate reform would be. Or it may have been an exceedingly shrewd gamble—let the buildup of secondary school graduates proceed at full speed while the population was abundant, with the anticipation that in lean years there would be a substantial pool of recruits from which to draw for further training. If this was the case, the planners must have known that when the actual shortage set in, the curtailment of educational opportunity and/or educational reform along vocational lines would have to be initiated.

In either case, the first problem led quickly to the second, how should people be educated. Regardless of the particular supply and demand conditions, the alternatives open were: (1) polytechnical education subordinate to general schooling, (2) direct and immediate vocational training, or (3) vocational training coupled with some sort of general education. The last two alternatives were those preferred by the reform.

It became apparent that the expansion of secondary schooling was in fact incompatible with the goal of maintaining the level of new accessions to the labor force, and also that "polytechnical education" in its existing form—i.e., subordinated to general schooling—was failing to provide an adequate supply of the practical labor skills most needed in the economy. Accordingly, in 1958 it was recognized that drastic steps must be taken to constrict, rather than expand, regular secondary education, and at the same time to place major emphasis not so much on general polytechnical training as on the cultivation of specific vocational and job-oriented skills. These are the essential features of the educational reform program.

Although the program as finally enacted still has many loop-holes, it promises by and large to achieve the objectives insisted upon by the economic planners and the party. The majority of Soviet youths will be impressed into the productive labor force after a substantially shortened period of regular schooling, and only a minority—composed of the more gifted and, perhaps, the more privileged—will be able to continue formal, full-time education. The provision for an expansion of part-time educational facilities for those drafted directly into productive jobs is little more than an expedient concession designed to soften the unfavorable public impact of the curtailment of opportunity for obtaining full-time secondary and higher education.

In shifting major emphasis to a more practical type of labor training aimed at equipping students with the skills needed to make them immediately employable in the productive apparatus, the reform measures have, in effect, altered the Soviet concept of functional and vocational education. It is not to be expected, of course, that this change will result in any diminution of the stress on science and technology in Soviet school curricula; on the contrary, the emphasis on these fields of study will undoubtedly continue to increase. On the other hand, the establishment of immediate usefulness

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to the economy as a key criterion of the social value of education is bound to have an unfortunate impact on what may be termed general education, in particular the study of the humanities. This was, indeed, clearly foreseen by one of the leading participants in the 1958 debate. Pointing to various problems connected with the intensification of job-oriented vocational training, the prominent Soviet educator and member of the Academy of Pedagogical Sciences, N. Versilin, wrote:

> There are a variety of new contradictions in the organization of education . . . . First and foremost, we cannot resolve the problem of labor training without considering the necessity of improving general education; but to reconcile the two is extremely difficult. Secondly, a contradiction arises in connection with the [student's] freedom of choice of his vocational occupation and the selection of students by their aptitude, ability and interest. Children who live on Zelenina Street in Leningrad must attend Public School No. 44, and consequently all students must take their production training in the rope factory. Thus, place of residence decides the fate and vocational specialization of students in this school. Fortunately or unfortunately, the rope factory cannot employ all the graduates of this school, and the vocational trade specialty which the students have acquired cannot be used because there are only a few rope factories. A year ago the Baltic Machine Works required metal workers and milling machine operators, and this year it needs welders and assembly workers. What should the vocational orientation of the school be in this case? The increased emphasis upon vocational subjects has already considerably reduced the quality of general education. All attempts to combine education with production training in industrial enterprises have had negative effects. A student who works one day at a plant and goes to school the next cannot concentrate on his work either at the workbench or in the classroom. In accordance with Pavlov's theory, the habitual pattern is thus disturbed, and the processes of concentration are disrupted. After all, why should a student study for two years a trade which he could learn in a 3– to 6–month apprenticeship course anyway? [41]

In addition to the downgrading of general education, Mr. Versilin here puts his finger on the tremendous complications involved in developing a workable system of vocational training in the schools. The planning organs of the State Labor Reserve, according to an official report in April 1959, were called upon to work out "about 80,000 study programs" for vocational and labor training,[42] indicating that specialized training was envisaged for that number of different job titles! The solution actually embodied in the program of educational reform consists in superimposing on the standard general education curriculum a localized system of supplemental labor training shaped in accordance with local economic needs and the availability of skilled training outlets. This would appear to be the only practicable approach to the problem; yet it hardly promises to overcome all the various complications and difficulties pointed out by Mr. Versilin.

The meaning of the educational reform in the U.S.S.R., because of its complexity, is at least a controversial one. The interpretation given in this study is basically twofold. On the one hand, we argue that the timing of the reform and some of its features suggest that it is a measure designed to speed up additions to the Soviet labor force of young people with skill qualifications who are needed to alleviate the shortages caused by demographic trends. This is the short-run aim of the reform. On the other hand, we argue that the chief aim of the reform is the long-run refinement of the quality of Soviet labor. Obviously, this long-range objective calls for improvement of formal training along such lines as to enhance the skill preparation of the labor force. This latter objective is reflected not only in primary and secondary education, but also in semiprofessional and professional training programs.

3. *The 1958 Debate: Secondary Issues*

The key issue in the 1958 debate, then, was labor education—how to revamp the school system so as to make it more responsive to pressing national economic needs, without appearing to do too much violence to the long-proclaimed communist principle of full and equal educational opportunity for all. There were, however, a number of ancillary issues of some importance which were raised in the course of the public discussion, and which should be briefly reviewed.

[41] *Literaturnaia gazeta*, June 26, 1958.

[42] *Zasedaniia Verkhovnogo Soveta RSFSR, Stenograficheskii otchet* (April 14–16, 1959) (Sessions of the Supreme Soviet of the RSFSR, Stenographic Proceedings), Moscow, 1959, p. 47.

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The problem of gifted children.—The idea of establishing special school facilities for gifted students was among the more revolutionary proposals advanced in the debate. Khrushchev himself, as well as others, first broached it in the spring of 1958, and it was repeated in Khrushchev's September memorandum to the Central Committee, which stated: "There should be set up a number of schools for gifted children who show aptitude in physics, mathematics, biology, draftsmanship, etc. These youths should be prepared for entry into higher education in accordance with their special abilities." [43] As mentioned earlier, the head of the State Labor Reserve Administration, G. Zelenko, also advocated the idea, and the proposal received support in a number of published articles, some of them by leading Soviet scholars and scientists.[44] It was given further official endorsement in the November 1958 thesis of the Central Committee and U.S.S.R. Council of Ministers, which stated that "consideration should be given to the establishment of special schools for youths who show particular talent and aptitude for mathematics, physics, chemistry, and biology . . . which [schools] will admit youths who have been recommended by the educational councils of their [former] schools, and who pass a special examination." [45]

But despite its favorable reception by some scholars, the concept of special education for the gifted aroused misgivings in others, who opposed it either on grounds of impracticability,[46] or as a negation of the principle of equal educational opportunity. That the concept is heretical in the context of the educational philosophy professed in the Soviet Union since the days of the Revolution is beyond dispute, for this philosophy has always rejected the idea of inborn ability or aptitude.

Moreover, in practical application, the principle of special schooling for gifted students could well give rise to new conflicts: for it would pose the delicate problem of how, and by whom, extraordinary talent would be identified, and the selection of students made, with the potential danger of stimulating the very "competition of parents" which Khrushchev was already deprecating—but on a far more serious scale. This was, indeed, one of the criticisms explicitly voiced in many press articles,[47] along with others to the effect that the system, if adopted, would encourage snobbishness, anticollectivism, egotism, and other forms of moral deterioration: that it would accentuate urban-rural inequalities since the special schools would inevitably be located in the cities; and that it would aggravate such evils as "grade chasing" and fraudulent examination practices.

A report prepared by a research group at the Institute of Psychology of the Ministry of Education of the Ukrainian SSR likewise came to the conclusion that "narrowly specialized schools for gifted children [*odarennykh detei*] would have undesirable social consequences." [48] While agreeing that differentiated secondary education was essential for the training of needed scientific cadres, the report contended that the differentiation should be one of "profile" (i.e., instruction program) only, and that to separate the gifted by putting them in special schools would do more harm than good. In particular, the report maintained that exempting only gifted students from labor would tend to give them "unhealthy feelings of inadequacy."

It has long been the practice of the Soviet Government to operate separate school facilities for those talented in ballet, art, music, and other performing arts. Such schools continue to exist. The issue raised by the debate, however, concerned schools for the *academically* gifted. As a result of the barrage of criticism against the latter kind of special schools, the proposal was shelved for the time being. At the December

[43] *Pravda*, Sept. 21, 1958.

[44] E.g., N. N. Semenov, cowinner of the Nobel Prize for chemistry in 1956 and member of the U.S.S.R. Academy of Sciences, advocated special, separate education for gifted students in a variety of fields, especially science (*Pravda*, Oct. 17, 1958). Another proponent was the internationally known mathematician, A Kolmogorov. (See *Trud*, Dec. 10, 1958.)

[45] *Pravda*, Nov. 16, 1958.

[46] There was a particularly sharp polemical exchange on this question between Academicians Zel'dovich and Sakharov, both of whom advocated special schools for promising students of science and mathematics (*Pravda*, Nov. 19, 1958), and Academician Lavrent'ev, who argued that the system would not work because many scientists who later win recognition as "geniuses" are judged "incompetent" while in school, and because creative ability cannot be "trained."

[47] E.g., *Sovetskaia Kirgiziia*, Oct. 8, 1958; *Pravda*, Dec. 11 and 13, 1958 (letters from readers); *Trud*, Nov. 22, Dec. 8, 1958; *Uchitel'skaia gazeta*, Dec. 5, 1958; *Pravda Ukrainy*, Dec. 21, 1958.

[48] *Pravda Ukrainy*, Dec. 18, 1958.

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1958 session of the Supreme Soviet, which ratified Khrushchev's reform program, it was announced that the matter would receive "further study," [49] and there was no mention of it in the educational reform law.

The idea, however, is by no means dead. There is evidence indicating that experimental programs of special instruction for gifted children, particularly in the sciences, are being carried on as supplements to the regular school curriculum. Moscow State University, for example, is conducting a program of special instruction in mathematics in several Moscow schools; the program provides two 2-hour periods of instruction per week and is restricted to selected students in grades 9–11.[50] Instruction goes much beyond ordinary secondary-level mathematics, taking in analytical geometry and higher mathematics (including differential calculus and differential equations), as well as theoretical mechanics and the application of mathematics to physics. Similar special programs reportedly have been initiated by engineering institutes in some Moscow secondary schools, and there have been indications that such experiments are also being conducted elsewhere in the Soviet Union (e.g., at Ivanovo).

Language of instruction.—Because of the multinational composition of the U.S.S.R., local variations in the language of instruction are an established feature of the Soviet educational system. In non-Russian nationality areas, some schools conduct instruction in Russian, and others in the native language of the area. All schools teaching in the native language, however, are required to give instruction in the Russian language and literature as a separate, compulsory subject, and in certain localities the Russian-language schools have hitherto also required their students to receive instruction in the native language and literature.

In the course of the debate on educational reform, proposals were made in favor of certain modifications of the existing set-up. Specifically, it was proposed that parents be given an "option" of enrolling their children in either a Russian-language or a native-language school, and that in those Russian-language schools requiring supplementary study of the native language, such study be made optional instead of compulsory. The reasons behind these proposals related not merely to an alleged overburdening of the pupils, but also to the fact that the steady progress of Russification in the various nationality areas had rendered the compulsory native-language requirement awkward. Both proposals were ultimately incorporated into the educational reform measures,[51] and in all probability the effect of these modifications will be to further promote Russification since the majority of parents are likely to consider it much more advantageous for their children to concentrate on learning Russian, as the official language.

With regard to foreign language study in the general school system, the reform measures retain instruction in one foreign (Western) language as a minimum requirement, with study of more than one such language to be optional. In general, the reform program envisages an expansion of foreign language instruction—in terms of both facilities and number of students.

Multitrack education and electives.—As mentioned earlier, the plan of educational development which the RSFSR Academy of Pedagogical Sciences first put forward in 1957, and which Goncharov and others continued to advocate in the 1958 debate,[52] envisaged introduction of the "furcation" or multitrack system in the upper secondary grades of the schools. Varying suggestions were offered during the debate regarding the breakdown into differentiated tracks or fields of specialization, but the most commonly advocated division called for three main tracks: (1) Mathematics—physical sciences—industrial skills; (2) chemistry—b i o l o g y—agricultural skills; and (3) social sciences—humanities—clerical and business skills.[53] As already noted, however, the furcation principle was not adopted in the final reform measures.

The advocates of multitrack secondary education also broached the idea of introducing "electives" as a means of further differentiation within the various tracks. It is important to note, moreover, that the "electives" proposed by Soviet educators were quite different from what this term connotes in the American educational

[49] *Izvestia*, Dec. 24, 1958.
[50] *VVSh*, No. 11, November 1959, pp. 66–67.
[51] See appendix I—ERL, art. 15.
[52] *Sovetskaia Rossiia*, May 18, 1958.
[53] See esp. *Sovetskaia Rossiia*, Dec. 12, 1958; *Komsomol'skaia pravda*, Sept. 17, 1958; *Sovetskaia pedagogika*, No. 6, 1958 (article by Goncharov).

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system. Though usually translated literally as "elective subject," *fakul'tativnyi predmet*—the term used by Soviet pedagogues—actually signifies something that might better be called "supplemental option." In other words, the term refers to a set of fixed courses which the student would have the option of taking or not taking, as a supplement to the prescribed standard program of study in any given track. Soviet educators have, indeed, explicitly condemned the elective system as applied in American high schools, calling it "irrevocably damaging to education." [54] As one of them remarked during an observation tour of the United States, "We believe in educational democracy through a choice of *required programs*, but not in anarchy where anyone can choose what he pleases without a predetermined goal. We decide the goals that the students must choose. This is *real* democracy."

School entrance age.—The educational plan of the Academy of Pedagogical Sciences originally proposed, as noted earlier, that the age of entry into primary school be lowered from 7 to 6 years. Later proposals envisaged an intermediate solution whereby the general entrance age would remain fixed at 7 but pupils might be accepted at age 6 if found, by means of examination, to be mentally ready to enter school.[55] Neither of these modifications, however, was incorporated into the reform measures, which leave the entry age at 7, without exception, for this was still considered the most suitable age to begin a gradual and orderly process of learning.

Length of compulsory schooling.—During the 1958 debate, some articles in the Soviet press advocated that the basic period of required schooling—embracing the primary and junior secondary grades—should be fixed at 9 years instead of the officially proposed cutback to 8 years.[56] The longer period was urged on the ground that it would lessen the danger of "overburdening" which was likely to result from the addition of labor training and (in the lower grades) manual crafts to the required curriculum.[57] Under the reform measures, however, 8 years has become the standard term of required schooling for the U.S.S.R. as a whole.

It should be noted that, prior to 1958, various proposals had been made by Soviet educators in favor of extending compulsory schooling to include all secondary grades (i.e., through grade 10 or age 17). In the debate leading up to the educational reform, however, this suggestion was put forward only in isolated instances,[58] and for all practical purposes any idea of extending universal, compulsory education beyond the 8-year level has ceased to be an active issue. The reform thus constitutes a retreat from the policy which advocated universal and compulsory secondary education (i.e., through 10-year schooling) during the 1950's. The upper grades (9–11) of the newly established 11-year school will be "available" in all localities, but only the 8-year school will be universal and compulsory.

Methods of combining study and work training.—Still another topic that received attention in the 1958 debate was the problem of the most suitable method of dividing the pupils' time between regular class instruction and on-the-job labor training. One of the proposed solutions envisaged a split-day system whereby the morning half of the daily schedule would be devoted to class instruction, and the afternoon to on-the-job training. In rural schools this training would consist of actual work in the fields,[59] and in schools in urban industrial districts, of labor in local industrial plants.[60] Another proposal favored modifying the annual school term to run from November through May, devoting this period to school instruction and requiring students to spend the remainder of the year in actual employment; [61] and in some of the republics it was proposed that the upper grades (9–11) of rural schools operate under a quarterly system, whereby students would spend alternating 3-month periods attending school and working.[62] The solution that was finally adopted requires that students in the upper grades—i.e., present 8–10 or future 9–11—spend 2 days per week during the school year in on-the-job labor training, in addition to several weeks of job assignment during the summer months.

[54] *Sovetskaia Latvia*, July 30, 1958.
[55] *Sovetskaia Moldavia*, Dec. 9, 1958.
[56] E.g., *Sovetskaia Litva*, Oct. 23, 1958; *Sovetskaia Estonia*, Oct. 31, 1958.
[57] The problem of "overburdening" in the reformed school system is discussed in ch. II; see section entitled "The Soviet Pupil in a Squeeze."
[58] *Sovetskaia Moldavia*, Dec. 4, 1958.
[59] *Ibid.*, Oct. 24, 1958.
[60] *Sovetskaia Kirgiziia*, Nov. 21, 1958.
[61] *Sovetskaia Moldavia*, Dec. 8, 1958.
[62] *Kommunist Tadzhikistana*, Nov. 26, 1958.

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In addition to these ancillary issues, the 1958 debate brought forth the usual pronouncements in favor of more and better qualified teachers and improved textbooks, school facilities, and instructional aids. The official propaganda campaign associated with the educational reform left no doubt, however, that any such improvements would be oriented toward the goal of glorifying productive labor under the slogan coined by Khrushchev: "Study and work go hand in hand" (*Uchenie i trud vmeste idut*).

4. *The Reform on Other Levels of Education*

While the educational debate centered primarily on the reorganization of the structure of and instruction in primary and secondary schools, one of the recurrent issues was the standards and procedures of admission to semiprofessional schools and higher educational institutions. This complex issue will be discussed in detail in chapters III and IV, together with the reorganization of the instruction programs in the respective institutions.

The Soviet Educational Structure: Prereform and Postreform

In order to achieve its aims in the field of education, the most important of which is to assure an adequate flow of trained manpower into the various occupations essential to the functioning and further growth of Soviet society, the U.S.S.R. maintains a vast and complex network of state-run educational facilities. It also maintains an extensive bureaucratic apparatus of control, different parts of which are charged with supervising particular segments of the educational structure and particular types of training, and others with estimating national needs for various categories of trained manpower and seeing to the execution of state policies respecting their placement in the economy.

Chart I presents a comparative diagram of the Soviet educational structure before and after the current reform program, with a parallel diagram of major United States educational institutions to aid in understanding the Soviet system. The prereform Soviet structure as shown represents the school system as it evolved on the basis of the earlier educational reforms of the early and middle 1930's, incorporating further minor changes that were introduced during and following World War II. The postreform structure shows the Soviet school system as it will be when the modifications provided for by the 1958 educational reform law and the implemental union-republic education acts of 1959 have been fully put into effect, scheduled by 1963.

For reasons of simplified comparison, the chart purposely does not show the great diversity of American educational institutions in the same detail as is provided in the diagrams of the Soviet school structure. It should be noted, however, that the latter diagrams also are not altogether complete, being largely confined to what may be termed *regular* educational facilities. In addition to the regular school structure, the Soviet Union also has various separate structures of alternative or equivalent educational facilities which are of some importance and will be mentioned in the textual discussion. By way of clarifying the background, the discussion will further touch upon some of the educational institutions which existed in the U.S.S.R. prior to the 1930's. As a final note, it should be added that, in explaining the Soviet school structure, the author proposes in general to employ equivalent English educational terminology rather than literal translations of Russian terms in order to avoid possible ambiguity in the later chapters.

Besides the system of regular Soviet schools, the following parallel structures of alternative training facilities may be singled out: (1) The system of adult education and extension-correspondence schools; (2) the system of formal on-the-job industrial training courses, retraining and qualification-upgrading programs; (3) the system of military and security police career training schools (indicated on chart I only at the professional level); and (4) the system of party schools and of special training facilities for enterprise management personnel (so indicated on the chart only at the professional level). In addition, there are many other types of training facilities, such as *rabfak*, university preparatory courses, people's universities of culture, etc., which are not integrated into the educational structure proper, but which in some instances

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can be equated to a certain level of regular education.

For lack of a better term, all these separate networks of educational facilities will be called "alternative equivalents" to the regular schools, bearing in mind, however, that in many instances they actually are not equivalent in terms of both quality and, occasionally, the degree of training provided. (These matters will be further discussed in subsequent sections of this survey.) But even if it is misleading, the concept of "equivalence" is important because of its place in Soviet procedures of educational certification—i.e., official certification that a student has completed a given level of schooling. Such certification is essentially a prerequisite for admittance to educational facilities on the next higher level, but it does not, by itself, assure entry into a higher-level institution. The student's opportunity to pursue his education further is also dependent upon screening and selection procedures, as well as on personal circumstances. Nevertheless, the certification—whether it applies to the completion of a certain level of regular schooling or of its "equivalent" in one of the alternative training systems—is the basic, indispensable requirement for gaining access to a higher level of educational training.

To show how "equivalence" works in practice, let us take two examples. In the case of a student who has completed 7 years of regular schooling and then is placed in a trade school of the State Labor Reserve (2-year course), the rules do not permit him to seek admission to higher education without certified completion of an "equivalent" of secondary school, e.g., adult education schools for working or rural youth. On the other hand, in the case of a student who, after 7 years of regular school, attends and graduates from a military school (also a 2-year course), the rules entitle him to certification of completion of "secondary specialized education" and to apply for admission to higher education without further secondary schooling. Thus, in the latter case, the student is considered, in the formal sense, to have completed the "equivalent" of regular secondary education, although in the real sense he may have had no more general education than the student who attended a Labor Reserve trade school. Many such examples could be cited. In any event, whatever the individual's actual educational attainment may be, it is the prescribed "equivalence" value of the type and level of alternative training facility he has attended which determines the certification he receives as evidence of formal eligibility for seeking admission to a higher level of the educational system.

Educational facilities in the Soviet Union, as in many other countries, may be broken down into four main levels. However, only the regular school structure embraces institutions on all four levels, whereas the "alternative equivalent" training systems are, in most instances, limited to facilities and programs on the level of secondary or of partial (i.e., incomplete) higher education. The four main levels of the regular educational structure are: (1) preschool training (*doshkol'noe obrazovanie*); (2) elementary, junior (or incomplete) secondary, and senior (or complete) secondary education (*nachal'noe, nepolnoe srednee i polnoe srednee obrazovanie*); (3) higher education (*vysshee obrazovanie*); and (4) advanced academic training. In the following discussion, each of these levels will be examined in turn, first in terms of the pre-1958 school structure and then of the modified structure provided for in the reform program of 1959–63, with an accompanying résumé, where applicable, of "alternative equivalents" in the training systems outside the regular school system.

1. *Preschool Education*

Prereform structure. The facilities on this level are of two types: creches (*iasli*) and nursery schools (*detskie sady*). The term "kindergarten," though often applied to the latter, should be avoided because it has a quite different connotation in the American educational setting. A facility similar to the American kindergarten did exist widely in the Soviet Union in the late 1920's and early 1930's, and it still exists today in some Soviet schools (in the Georgian and Ukrainian union republics and the Baltic republics) under the name "zero grade" (*nulevka*). Generally speaking, however, the Soviet nursery school is a preschool establishment similar to the American nursery school. All the permanent creches and most nursery

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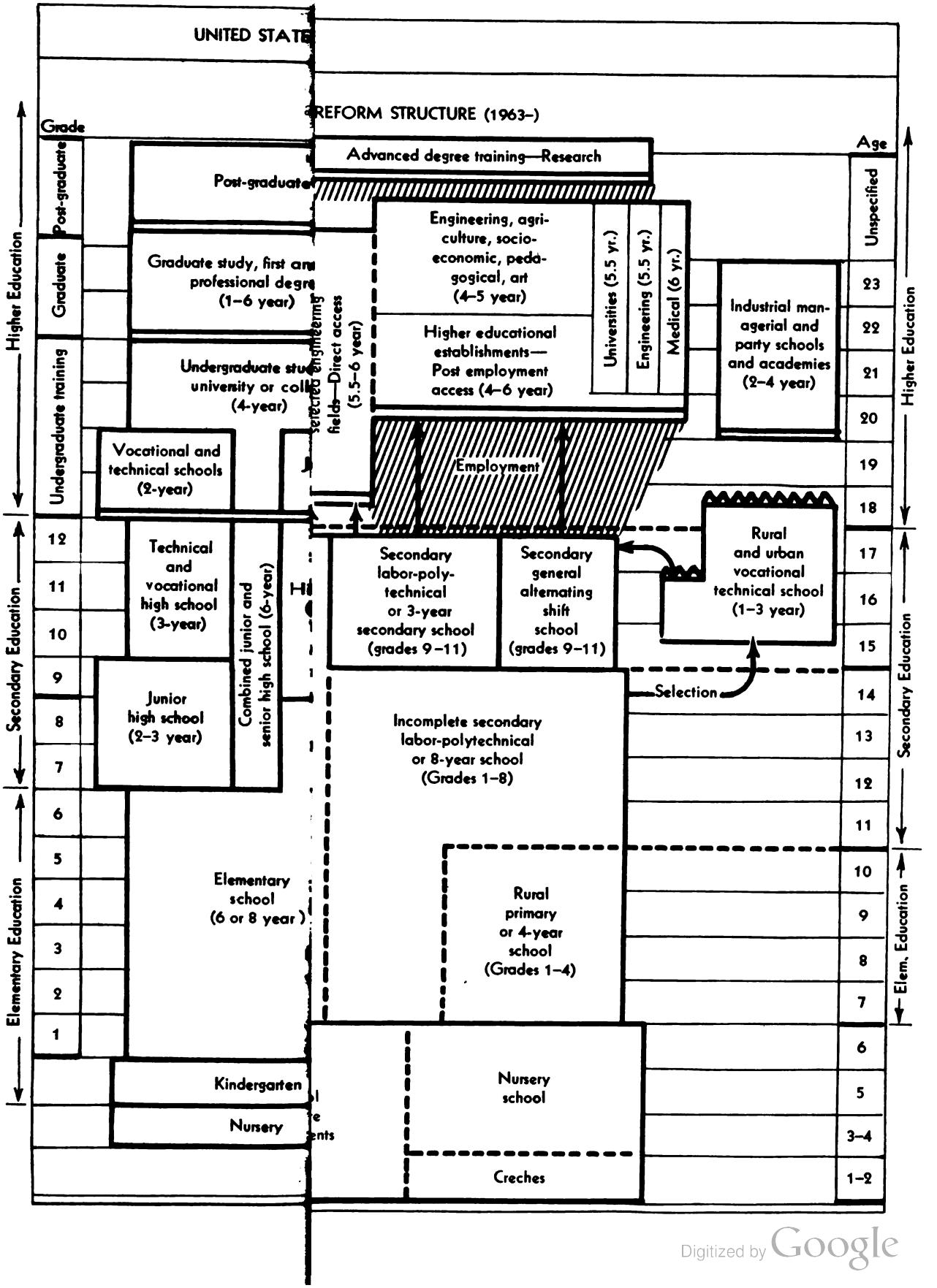

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schools in the U.S.S.R. operate on a full-day schedule (about 9 hours), providing child care and guidance service. The age range of children in the creches is from a few months to 3 years, in the nursery schools from 3 to 7 years. In addition to the regular facilities, there are seasonal creches and nursery schools.

Creches and nursery schools came into existence in the early 1920's. Their facilities were greatly expanded during the 1930's and again in the 1950's, primarily as an aid to working mothers. The creches in all cases are operated by local economic enterprises, producers' cooperatives, trade unions, collective farms, etc.; the nursery schools are similarly run in most cases, but some are operated directly by the local educational authorities. The educational authorities do, however, exercise control over the form and kind of training in all preschool facilities. In addition, the union-republic Ministries of Public Health supervise staff appointments (especially of nurses) and all activities in the creches, as well as physical education and medical care in the nursery schools. Neither creches nor nursery schools are universally available, and parents are required to pay from 25 to 35 percent of the actual cost of the child's care and maintenance. Enrollment in most nursery schools is restricted to children whose parents are employed either in a certain occupation or in the specific economic enterprise or organization which maintains the school.

Postreform structure.—Neither the centrally-enacted educational reform law of 1958 nor the implemental legislation of the union republics touched upon preschool education. In May 1959, several months after the central reform law was adopted, separate decrees were issued providing for the establishment of "consolidated" preschool child-care establishments (*ob'edinennye doshkol'nye detskie uchrezhdeniia*). Eventually all preschool facilities are to be of this single "consolidated" type, but for the present, creches and nursery schools will continue as separate institutions. The RSFSR Academy of Pedagogical Sciences is to draft a charter for the consolidated preschool establishments, formulate the content of the instructional program, and work on methodological teaching problems. The republic Ministries of Education will supervise execution of the instructional program, and the Ministries of Public Health are to supervise hygiene and child-health aspects. The actual operation and financial upkeep of these consolidated child-care facilities will remain, as in the past, largely the responsibility of individual economic enterprises and organizations, which will be required to allocate internal funds for their own establishments and will give admission preference to children of their own employees or members. However, a network of additional preschool establishments will be set up under direct operation by the local school administrations and will be financed out of city or regional budgets.

2. *Elementary, Incomplete Secondary, and Complete Secondary Education*

The next major level of the Soviet educational structure embraces both elementary and secondary education, subdivided into the three components, or sublevels, listed above. The educational facilities operating within this range fall into three principal functional categories: (A) "general education" schools (*obshcheobrazovatel'nye shkoly*); (B) institutions of vocational-technical education (*professional'no-tekhnicheskoe obrazovanie*); and (C) institutions of secondary specialized education (*srednee spetsial'noe obrazovanie*). The pre- and postreform structures for each of these institutional categories will be separately treated in the following discussion.

(A) *General education schools.*—The main pillar of the Soviet educational system is the so-called "general education" (now renamed "general education labor polytechnical") school, which embraces facilities on all three sublevels—elementary, incomplete secondary, and complete secondary.

Prereform structure. Until the mid-1930's, the Soviet system of elementary and secondary education was based on 9-year schooling (*deviatiletka*), consisting usually of 4 years of elementary education in a "people's school" (*narodnaia shkola*), 3 years of junior secondary education in a "first-division school" (*shkola pervoi stupeni*), and 2 years of senior secondary education in a "second-division school" (*shkola vtoroi stupeni*). These were the standard components of 9-year

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schooling, although the terms of instruction in the first- and second-division schools were actually not uniform.

In 1934 the 9-year system was replaced by 10-year schooling (*desiatiletka*), which remained the formal basis of the regular school structure in the U.S.S.R. up until the adoption of the current reform program. The standard components of 10-year schooling were: 4 years of elementary (*nachal'noe*) education, 3 years of junior or "incomplete" secondary (*nepolnoe srednee*) education, and 3 years of senior or "complete" secondary (*polnoe srednee*) education (as compared to the American system of 6 years' elementary schooling, 3 years of junior high school, and 3 years of senior high school; or sometimes 8 years of elementary and 4 years of high school).

Regular elementary and secondary schools were of three types: (1) 4-year schools providing only elementary education; (2) 7-year schools (*semiletka*) combining 4-year elementary schooling and 3-year junior secondary education; and (3) complete 10-year schools providing, in addition, the three senior secondary grades. In 1958, only about 15 percent of all Soviet general education schools were of the complete 10-year type; approximately 29 percent were 7-year schools; and the remaining 56 percent were 4-year elementary schools, which were especially predominant in rural areas.

Seven-year education could be obtained in one of three different ways: by attending a 7-year school from start to finish, by completing the first 7 grades in a 10-year school, or by first completing the elementary grades in a 4-year school and then transferring to a 7-year or 10-year school for the three junior secondary grades. Similarly, a student could acquire 10-year education either entirely in a 10-year school, or by transferring to one after completing either of the lower-type schools. With the age of entry into elementary school set at 7 years, the normal age for completion of junior secondary schooling was 14, and of senior secondary education, 17.

On the basis of special examinations given at the end of the 4th, 7th, and 10th grades, passing students received certifications appropriate to the particular level of education completed. Particular emphasis was placed, from the late 1930's, on the terminal examinations for students completing the final grade of 10-year school, and this led to the introduction, in 1944, of the "maturity certificate" (*attestat zrelosti*), granted to those who successfully passed terminal examinations covering the entire 10-year-school program of instruction. Those who failed to pass received only a certification of school attendance.

In addition to the regular elementary and secondary schools, the prereform educational system also provided various "alternative equivalents," both formal and informal. Most of these were forms of adult education on the elementary-secondary level. In the 1920's and early 1930's, for example, there was an extensive network of adult evening schools for the elimination of illiteracy and semi-illiteracy (*shkoly po likvidatsii negramotnosti i malogramotnosti*). There were also "first-level" adult education schools (*shkoly vzroslykh pervoi stupeni*), considered equivalent to regular primary school, and "second-level" adult education schools (*shkoly vzroslykh vtoroi stupeni*), considered equivalent to education through 7–9 grades of regular school. After the mid-1930's, individual grades in evening schools of adult education on the elementary-secondary level were equated with the corresponding grades of regular school.

Two other types of adult education facilities were common prior to 1940 but then were discontinued: "preparatory courses" (*kursovaia podgotovka*) and "workers' faculties" (*rabfak*).[63] The preparatory courses, conducted by the regular schools, were considered equivalent to the last two grades of regular secondary education and were open to adults who had gone through 7-year school and wished to complete their qualifications for entry into higher educational establishments or secondary-level semiprofessional schools. The workers' faculties offered 4-year intensive courses of daytime or evening instruction which supposedly covered the entire program of the regular schools through the secondary grades. The faculties were jointly operated by higher educational institutions and the government commissariats (ministries) in charge of different sectors of the economy. Al-

[63] See F. M. Tandler, *The Workers' Faculty (Rabfak) System in the U.S.S.R.*, unpublished Ph.D. dissertation, Columbia University, 1955.

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though both of these institutions went out of existence after 1940, other facilities whereby adults could obtain the "equivalent" of regular elementary and secondary education remained available.

World War II brought into being two new kinds of special educational facilities providing elementary and secondary-level schooling: the schools for working youth (*shkoly rabochei molodezhi*) and schools for rural youth (*shkoly sel'skoi molodezhi*), both organized in 1943–44. The establishment of these schools was originally conceived as an emergency measure designed to offset the disruption of the regular school system in many war-affected areas and the diversion of large numbers of youths of school age (12–17 years old) into the State Labor Reserve training system and thence into production jobs. However, they remained in existence after the war, serving primarily as educational outlets for youths between the ages of 14 and 25 who had been obliged to discontinue attendance in regular school to enter active employment (directly or via the State Labor Reserve draft), to perform military service, or for some other reason. As will be pointed out in the following discussion of the postreform structure, the schools for working and rural youth have now become an important and integral part of the regular school system.

The schools for rural youth provided all three levels of regular elementary and secondary education, while the schools for working youth offered only the two secondary levels (i.e., junior secondary, grades 5–7 and senior secondary, grades 8–10). However, the latter also offered a preparatory grade, designed for those who had not received elementary instruction. The schools for working youth operated on three shifts (morning, afternoon, and evening), so that students could arrange their attendance according to their work schedule. These schools were officially rated as "equivalent" to the corresponding levels of the regular general education school, and graduates therefore were entitled to the same certification, including the maturity certificate. Both types of schools were administered by the republic Ministries of Education in the same manner as the regular schools.

Postreform structure.—Under the educational reform program, the structure of Soviet "general education" schooling at the elementary and secondary levels will undergo a number of basic changes which are scheduled to be fully in effect by 1963. A completely revised and extremely cumbersome terminology is used to designate the new school units, and is indicative of the fundamental purpose of the reforms—to place heavier emphasis on labor training. The former generic term, "general education school," has been expanded to "general education labor polytechnical school" (*obshcheobrazovatel'naia trudovaia politekhnicheskaia shkola*), which is combined with other adjectives and descriptive terms to indicate the particular level or specific type of school unit. (In the following discussion, the generic term will be abbreviated simply to "general labor school.") The basic changes in structure resulting from the reform may be briefly summarized as follows:

(1) The former 10-year school, which consisted of 4 elementary, 3 junior secondary, and 3 senior secondary grades, is replaced as the basic unit of general education by a "junior (or incomplete) secondary" general labor school, or simply 8-year school (*vos'miletniaia shkola*), comprising only two levels: elementary, grades 1–4; and junior secondary, grades 5–8. The 8-year school satisfies the standard educational requirement and is designed to be terminal, except for students opting and qualifying for one of four types of upper secondary schooling. These options include two types of secondary-level general labor schools, as outlined in (2) below. The other two options fall in the categories of vocational-technical and secondary specialized training establishments, and are separately dealt with in the appropriate sections.

(2) Secondary education beyond the 8-year school will be provided, alternatively, by (*a*) secondary general labor school with production training (*sredniaia obshcheobrazovatel'naia trudovaia politekhnicheskaia shkola s proizvodstvennym obucheniem*); or (*b*) evening or alternating-shift secondary general education school (*vecherniaia smennaia sredniaia obshcheobrazovatel'naia shkola*). Both these are 3-year schools, embracing grades 9–11. The first may be referred to simply as regular secondary school, and the second as alternating-shift secondary school.

(3) In addition to the 8-year schools and

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3-year regular secondary schools operated as separate units, the new educational structure will include a combined type of "complete secondary" (*polnaia sredniaia*) general labor school with all grades, 1-11 (a counterpart of grades 1–10 of the present 10-year school). These are commonly referred to as 11-year schools (*odinadtsatiletnie shkoly*).

Thus, the three major school units which will provide elementary and secondary "general education" in the postreform school structure will be the basic 8-year elementary-junior secondary school; the 3-year secondary school in either of the two forms indicated above (i.e., regular or alternating-shift); and the complete 11-year school. Under the new organization, elementary school will no longer be considered a separate entity, although in fact the existing 4-year elementary schools in sparsely populated rural areas will continue to function as transfer units. Implementation of the structural changes will involve the conversion of former 7-year schools into 8-year schools. The former 10-year schools will be converted into (1) 8-year schools only; (2) separate 3-year regular secondary schools (grades 9–11); and (3) complete 11-year schools.

As in the past, school attendance will begin at age 7, so that students will normally complete basic 8-year school at 15 or 16. Students finishing 8-year school will receive certification of completion of required basic schooling. Those who go on to finish 3-year secondary school, and graduates of complete 11-year schools, will receive certification of completion of secondary education (*attestat o srednem obrazovanii*), as well as a certification of labor qualification (*svidetel'stvo o proizvodstvennoi kvalifikatsii*).

With regard to the alternating-shift secondary schools, it is important to note that they are actually the former schools for working and rural youth, which have thus been integrated into the postreform educational structure as one of its major components. In fact, since the bulk of Soviet youths will enter active employment directly upon completing 8-year school, the evening or alternating-shift secondary schools will become the most common form of secondary education. In localities where the demand is not large enough to require separate facilities, these part-time schools will continue to be attached to and operated by the regular schools (either separate secondary or complete 11-year schools); elsewhere, separate schools will be established by converting former 10-year school secondary facilities. Some schools will conduct evening classes only, while others will provide instruction in morning, afternoon, and evening shifts in order to accommodate the students' work schedules. Some will also offer preparatory courses in addition to the usual grades 9–11. Graduates will receive the same certification of secondary school completion as graduates of regular secondary schools.

Brief mention should also be made of the new-type boarding schools (*shkoly internaty*) introduced in the Soviet Union since 1956. These will be retained in the postreform educational framework and will include three types: (1) schools paralleling the new 8-year school; (2) schools paralleling the new 11-year school; and (3) special schools for the blind and the physically handicapped. The first two types are considered regular schools. In addition, some of the regular 8- and 11-year schools will operate on an extended time basis, under which the students will remain in school for 8 to 10 hours daily instead of the usual 4 to 6 hours. The extra time will be used to prepare homework assignments, participate in organized sports, various skill activities, etc.

(B) *Vocational-Technical Schools.*—The facilities in this second major functional category are restricted to various types of schools operating at the upper secondary level and accommodating students who have already completed regular elementary and at least partial secondary education.

Prereform structure.—Prior to 1958, the Soviet Union had gradually built up an extensive network of vocational, technical and trade schools supplementing the general school system. During the 1920's and 1930's, various kinds of vocational-technical schools came into existence, operated either by individual economic enterprises or by the commissariats (later, ministries) in charge of economic administrations. They primarily absorbed youths in the 14–16 age group, who had gone through 5–7 years of regular schooling and who then desired to transfer to vocational training. Oc-

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casionally, however, in the late 1920's and early 1930's, students who repeatedly failed to advance in regular junior secondary schools were involuntarily transferred to vocational schools.

The establishment of the Main Administration of the State Labor Reserve in 1940 marked the first step in the organization of a system of schools for skilled and semiskilled labor training under centralized administration. During the 1940's, the newly organized Labor Reserve schools were filled by means of drafts of youths between the ages of 14 and 17. The drafts were carried out according to a classification system which assigned first priority to those neither attending school nor employed; second priority to "over-aged" pupils (*pererostki*) in the lower secondary grades (5–7) of regular school, in most instances "repeaters" with unsatisfactory scholastic or attendance records; and third priority to students in the lower secondary grades of schools in rural areas only. All students in the upper secondary grades (8–10) of regular school were automatically exempted from the draft.

There were various types of State Labor Reserve schools, but they fell into three general categories: (1) Trade schools (*remeslennye uchilishcha*), which usually provided 2 or 3 years of training; (2) factory schools (*FZO—shkoly fabrichno-zavodskogo obucheniia*), which provided training courses of only 6 months to a year; and (3) schools for training certain kinds of skilled labor for agriculture, i.e., tractor drivers, mechanics, etc. (Schools of the third type were added only in 1953.)

Training in the trade schools was regarded in most instances as "equivalent" to the lower secondary grades (5–7) of regular school, and graduates of these schools could thus have access to further formal education through attendance in an "alternative equivalent" of regular secondary school: i.e., either a semiprofessional school or a school for working youth. The factory schools, on the other hand, were exclusively devoted to short-term skilled and semiskilled labor training and therefore were not considered "equivalent" to any level of regular schooling. Factory school trainees could acquire further formal education only by first attending the part-time schools for working youth.

In 1954 the Main Administration of the State Labor Reserve set up a number of vocational-technical schools (*tekhnicheskie uchilishcha*). These establishments accepted graduates of regular 10-year school for skilled labor training.

In addition to these formal types of vocational, trade and technical schools, there were various formal and informal training programs for skilled and semiskilled labor, operated by various economic units. These programs were, of course, conducted entirely outside the formal educational system and were not equatable with any specific school level, but in general they were pitched at the junior secondary level of aptitude or comprehension.

Postreform structure.—In accordance with the educational reform law, the State Labor Reserve administration was reorganized in the summer of 1959 as the State Committee of the U.S.S.R. Council of Ministers for Vocational-Technical Education (*Gosudarstvennyi Komitet Soveta Ministrov SSSR po Professional'no-Tekhnicheskomu Obrazovaniiu*), and the former Labor Reserve schools have been transformed into urban vocational-technical schools (*gorodskie professional'no-tekhnicheskie uchilishcha*) and rural vocational-technical schools (*sel'skii professional'no-tekhnicheskie uchilishcha*). The length of training in the urban schools is from 1 to 3 years, and in the rural schools, from 1 to 2 years, the exact duration of any specific training course depending upon the type of work involved.

As a rule, the new vocational-technical schools will accept only graduates of 8-year regular school. A small number of existing technical schools for senior secondary school gradautes, in operation since the mid-1950's, will be retained for a few years but then are to be closed. The new vocational-technical schools will offer both daytime and evening programs. As in the past, vocational-technical school graduates, in order to qualify for higher education, will have to complete regular secondary schooling, primarily by attending alternating-shift secondary schools. They will also, as did former Labor Reserve trainees, have to fulfill an obligatory work requirement.

All formal and informal on-the-job training and apprenticeship programs will continue to be operated by individual enterprises and organizations, but must conform to plans ap-

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proved by the State Committee on Vocational-Technical Education.

(C) *Secondary Specialized Schools—Semiprofessional Training Establishments.—Prereform structure.*—For several decades prior to the 1958 reforms, the Soviet Union had a separate network of schools providing various types of "secondary specialized" education (*srednee spetsial'noe obrazovanie*). In the present study, either the term "secondary specialized," or simply "semiprofessional," will preferably be used as a general designation for these types of education.

The Soviet system of semiprofessional schools, whose origins go back to the pre-Revolutionary period, underwent a great expansion during the 1930's, especially in the early 1930's when there were mass transfers of students from the upper grades of the regular schools to semiprofessional training institutions. Enrollment in these semiprofessional schools frequently exceeded enrollment in grades 8–10 of the regular schools during the 1930's and 1940's. The semiprofessional schools were commonly called technicums (*tekhnikumy*),[64] although other terms (*uchilishche, shkola*) were sometimes used: e.g., the technicum for machine-building technicians (*mashinostroitel'nyi tekhnikum*), school of dentistry (*zubovrachebnaia shkola*), and normal school (*pedagogicheskoe uchilishche*).

Until the mid-1950's, students possessing certification of completion of 7-year regular school or its equivalent were eligible for admission to a semiprofessional school, conditional however upon their performance in competitive entrance examinations covering the 7-year school program. Completion of semiprofessional training was considered terminal, and graduates were normally required to assume specific jobs assigned to them on the basis of their particular type of specialized training. Consequently, although there were exceptions, most semiprofessional school graduates did not continue their education beyond this level. On the other hand, semiprofessional training was considered "equivalent" to complete regular secondary education, placing a graduation certificate from a semiprofessional school on a par with the "maturity certificate" received by graduates of the regular 10-year schools. For purposes of access to higher education, semiprofessional school graduates were considered to have completed secondary education only.

Most semiprofessional schools operated on a daytime schedule, but there were some which operated evening divisions. The training courses lasted from 3 to 4 years until 1953, when a number of new semiprofessional schools were set up. At that time some of the existing schools or their divisions were converted to 2-year or shorter training programs specially intended for those who shifted to semiprofessional training only after graduation from 10-year school, instead of after 7-year school. These were semiprofessional schools of an advanced type; and although they accepted students who had already completed general secondary education, they were still considered secondary schools.

Secondary semiprofessional schools also provided extension-correspondence training, which expanded significantly in the postwar period and was considered equivalent to regular training in the schools. Extension-correspondence training was offered either by special divisions of the regular semiprofessional schools or by separate institutions set up exclusively for this purpose. The schools which combined both regular and extension-correspondence training were called permanent secondary specialized training establishments (*statsionarnye srednie spetsial'nye uchebnye zavedeniia);* the schools of the latter type were called extension-correspondence secondary specialized training establishments (*zaochnye srednie spetsial'nye uchebnye zavedeniia*).

Postreform structure.—The educational reform law provides for two types of secondary specialized schools: regular, based on prior 8-year schooling; and advanced, based on prior 11-year schooling (or its "equivalent"). The general designation applied to all secondary semiprofessional schools remains essentially unchanged: they are called "technicums and other secondary specialized training establishments" (*tekhnikumy i drugie srednie spetsial'nye uchebnye zavedeniia*).

Three types of training program will be of-

[64] The term *tekhnikum* is used to designate not only schools training engineering technicians for industry but a variety of other types of schools, such as agricultural technicums, commercial and trade technicums, technicums for librarians, transportation technicums, etc.

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fered. One is called "full-time with leave of absence from employment," but actually is to be run on an alternating cycle of study and work. The other two types of program will be evening and extension-correspondence training, both without leave from work. As in the past, graduates of 8-year school and 11-year school (or its "equivalent") will be admitted on a competitive basis. Training courses will normally range from 2 to 4 years in length, depending on the particular type of training (as an exception, however, there will also be a 5-year program). Priority of admission is to be given to applicants with several years of gainful employment to their credit. One new feature is a requirement making supplementary training in a skilled labor occupation mandatory for all students.

(D) *Other Forms of Secondary Education Outside the Regular School System.—Secondary schools of the Soviet military and security establishment.*—One very important category of alternative educational facilities on the secondary level consists of military preparatory schools. Innocuously called "special secondary schools" (*spetsial'nye srednie shkoly*) or simply "special schools" (*spets shkoly*), these facilities were established in the mid-1930's and underwent a marked expansion during World War II. They were known during the war as "Suvorov military schools" (*Suvorovskie voennye uchilishcha*) and "Nakhimov military schools" (*Nakhimovskie voennye uchilishcha*), the former for boys preparing for ground or air force officer training, and the latter for those aspiring to naval careers.[65]

Both the Suvorov and Nakhimov schools provided only preparatory training for subsequent entry into the regular officer-training schools of the military and naval establishment. They originally were regular secondary schools but were modified to include military subjects and drill in the curriculum and placed greater emphasis on science and mathematics. The students also wore military uniforms but as a rule lived at home with their parents. The number of these schools, the majority of which are Suvorov schools, is not known but is believed to be several dozen.

For all practical purposes, these schools were equivalent to the complete regular 10-year schools, except that they had no first grade and devoted a considerable part of their curriculum to special military subjects and extensive physical and military training. During, but more especially after the war, changes were introduced whereby they became predominantly boarding schools for students above grade 4 in the Suvorov schools and grade 6 in the Nakhimov schools. These establishments were administered by the appropriate branches of the armed forces, and were designated as "schools of closed access" (*zakrytye shkoly*). In theory, the sons of all living members of the Soviet armed forces, or of those killed in action, were entitled to admission, but in practice, access was reserved for sons of those belonging to the officer corps.

Another type of military school which formerly functioned at the upper secondary level (grades 8–10) was the company-grade officers' training school (*voyennoe uchilishche*) (see also section on Higher Education). Until the outbreak of World War II, there were a large number of these schools, which admitted youths who had completed at least the 7th grade of regular school. Graduates were considered to have completed secondary education (or partial higher education). These military schools continue to operate, though entrance requirements in the majority of them have been raised so that they accept 10-year-school graduates. Thus, these schools (as well as civilian semiprofessional schools on the advanced level) actually give specialized training above the secondary level.

The state security police administration, or KGB (formerly NKVD, MVD) also operates a network of schools on this level. Some of them provide education equivalent to secondary specialized training; others offer education beyond the secondary level, and their graduates are considered to have "partial higher education."

Rarely does the Soviet press publish stories or announcements dealing with security police training institutions, and these are never listed

[65] General Suvorov was the Russian commander-in-chief in the Russo-Turkish wars of the 1770's and 1780's and later led the Russian expeditionary forces against France in 1799. Admiral Nakhimov commanded the Russian fleet which defeated the British in the early part of the Crimean war (1853), but later was forced to scuttle his ships in order to block the entrance to Sevastopol' harbor.

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in any directory of Soviet schools. Two KGB schools providing training of the "militia" type have been reported in operation in the cities of Minsk and Alma-Ata.[66] The Minsk school gives a 2-year course of training in what is called "jurisprudence," including "solid military training" and "judo," and accepts only candidates who have been discharged from the armed services and have completed 10-year school. The students fare much better financially than those in regular institutions, for in addition to free board, room, uniforms, and a transportation allowance, they also receive a monthly stipend of 400 rubles. Upon completion of the course, graduates are commissioned as "lieutenants" and assigned to duty as "operatives."

The educational reform law contains nothing bearing on the military and police training institutions. Nor has there been any allusion in the press to the effect, if any, of the reform measures on the role of these institutions.

Communist Party schools.—Another important component in the category of specialized educational establishments is the vast network of Communist Party schools. This network was very extensive during the late 1920's and most of the 1930's, when it embraced two types of schools. One group consisted of the so-called Soviet and party apparatus schools (*sovpartshkoly*), which provided courses of 6 months' to 3 years' duration, designed to train personnel for the lower and intermediate levels of the Soviet administrative bureaucracy. Training in this type of school was considered equivalent to intermediate and upper secondary training in the regular schools. Most of the schools operated during the day, but there were some evening schools as well. The schools of this type were discontinued around 1937.

The second group of party schools (still operating today) consisted of training establishments for party functionaries, agitators, organizers, etc. These are most commonly referred to simply as party schools (*partiinye shkoly*), but occasionally their titles are more specific, indicating a particular type of training for a certain level of the party organization. Training in these schools cannot be equated to any specific level of regular secondary schooling and simply represents a special form of training supplementing a person's normal education.

In addition, the party schools frequently conduct short-term courses (*kratkosrochnye kursy*) designed to improve the qualifications of party and government functionaries.[67] Usually these are of only a few months' duration and are restricted to enrollments of less than 100 persons per course. They are conducted under the supervision of the provincial party committees (*obkomy*).

The party schools are not affected by the educational reforms, and there is no reference to them in the 1958-59 decrees.

Theological seminaries.—The Russian Orthodox Church, as well as several other denominations, operates theological schools on the secondary level, which are financed entirely out of church funds. Admission is regulated by church authorities. There is also a theological academy run by the Russian Orthodox Church, which is considered a higher educational establishment.

3. *Higher Education*

Though built upon the foundations of pre-Revolutionary Russian institutions of higher learning which had their beginnings in the 18th century, the Soviet system of higher education has been fashioned and developed to serve quite different purposes. The task of the pre-1917 Russian universities was primarily to foster academic learning; today, Soviet higher education is charged with a threefold mission: to train professional specialists, to conduct state-directed research, and to disseminate approved forms of scientific and socioeconomic knowledge. And it is the first of these missions which has been and still remains paramount. The U.S.S.R. has no higher educational institutions which offer strictly liberal arts or general education programs not oriented toward some specific occupational or professional specialization, such as are generally provided in American colleges and universities. Soviet higher institutions of learning are designed, first and foremost, to provide specialized professional education.

(A) *Regular Institutions of Higher Education.*—

[66] *Sovetskaia Belorussia*, Apr. 18, 1959; *Kazakhstanskaia pravda*, Apr. 8, July 16, 1959.

[67] V. A. Malin *et al.* (eds.), *Spravochnik partiinogo rabotnika* (Handbook of the Party Functionary), Moscow, 1957, p. 430.

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Prior to 1917, the university was the principal type of Russian higher educational institution. Under the Soviet regime, the universities continue to form an important component of the higher educational structure, but they have been supplemented by a variety of individual "institutes" (*instituty*) which at present constitute the majority of all Soviet educational establishments at this level. The general term used to cover all such establishments is *vysshee uchebnoe zavedenie,* more commonly abbreviated to *VUZ*. Structurally, the already existing higher institutions have not been altered by the reform laws, although as indicated later a new type of establishment has been added to the pre-1958 system.

The Soviet institutes are individual units providing education in a single specialized field and are thus somewhat comparable to the separate medical, law, or engineering schools of large American universities, having their own facilities, physical plant, and administration, except that the Soviet institutes are entirely separated from the universities. Except for the new group of buildings housing Moscow State University, neither Soviet universities nor institutes have their facilities concentrated within American-style campuses; and the institutes are generally housed in city buildings.

Since the mid-1930's, eligibility for admission to any kind of higher educational institution has been limited to students who have had complete secondary education, i.e., possessing either the maturity certificate of 10-year school (prior to the 1958 reforms) or, less commonly, certification of completed secondary semiprofessional education. Actual admission is determined by competitive examinations covering the basic secondary school program. The period of training in higher educational establishments ranges from 4 to 6 years. Until 1955, there was an exception in the teachers' institutes (*uchitel'skie instituty*), which provided a 2-year training program for junior-secondary level teachers (grades 5–7), but these, with only one exception, have since been closed or converted into pedagogical training institutes with 4- or 5-year programs.

Upon completion of their training in higher educational establishments, students are required to pass state accreditation examinations or to defend their thesis-dissertation projects before specially-appointed boards—in some instances, both. If successful, they receive diplomas certifying completion of a certain type of professional training in a higher educational establishment. *No academic degrees* are granted, as in most West European universities and American colleges and universities.

There are also extension-correspondence training programs at the level of higher education. These are conducted either by extension-correspondence divisions of the regular or "permanent higher educational establishments" (*statsionarnye VUZ'y*) or by separate higher educational facilities offering only extension-correspondence training (*zaochnye VUZ'y*). Extension-correspondence training at the higher educational level has expanded greatly, especially since World War II, and is recognized as "equivalent" to regular higher education. (The increasingly important place of extension-correspondence training in Soviet education is discussed in detail in chs. III and IV.) Some higher educational establishments operate evening divisions *(vechernie otdeleniia)* in addition to regular daytime classes.

As stated earlier, the educational reform measures do not alter the already existing structure of higher educational facilities, but merely add one new type of institution to it: the "factory higher technical education school" *(zavod VTUZ)*. The distinctive feature of this new type of facility is that it will train technological engineers on the actual premises of large industrial enterprises. (It should be noted that the educational reforms, while not altering the outward structure of higher educational institutions, do involve significant *internal* changes in the content and organization of instruction, which will be examined in detail in ch. IV.)

Formal eligibility requirements for higher educational establishments remain unchanged, but the actual selection of candidates for admission will be greatly tightened. Except in the case of candidates for some university programs in mathematics and the physical sciences and some institute programs for engineers, consideration will be limited to applicants who have been *gainfully employed for 2 or more years* after completing secondary education. This has been promulgated as a policy objective, but we

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have yet to see how it will be implemented. The duration of training also remains the same (4–6 years), and there will be no changes affecting the operation of evening and extension-correspondence divisions. However, evening and extension-correspondence training is to be expanded at the expense of regular, full daytime programs of instruction under a new system of alternating periods of full daytime instruction and evening or extension-correspondence training (details in ch. IV).

Under the reform measures, higher educational establishments will be required to participate more extensively in other activities besides training, notably in research and in cultural services for the general public. Especially in the latter area, many innovations are planned. The existing regular higher educational establishments—universities and institutes—will offer special noncredit courses of the extension type, which will be open to voluntary enrollment by qualified individuals; and in addition so-called "universities of culture" *(universitety kul'tury)* are being newly established to provide courses of lectures on various subjects for persons not seeking any diploma credit or comprehensive professional training. Foreign language courses are also being set up on a similar basis. Another feature of this popular education program will be the required participation by higher educational establishments in conducting radio and TV instruction and lecture courses. All these innovations are presumably aimed at offsetting the inaccessibility of formal higher education except to the chosen few, by providing a substitute form of popular education accessible to the many who aspire to a higher educational level. Until the mid-1950's the Soviet Union did not really have a counterpart of American extension education (note again that the Soviet programs are exclusively designed for specialized professional training), and only with the new reform measures, is an attempt being made to introduce noncredit extension programs.

(B) *Military and Other Types of Higher Education.*—In addition to the regular higher educational establishments, the separate networks of military, security police, party and managerial training facilities also have establishments at this level. Training in these institutions is regarded as equivalent to regular higher education in terms of the level of qualification acquired. Admission to them, however, is largely by special appointment.

As mentioned earlier, some of the military schools for training company-grade officers are considered equivalent in level to secondary semiprofessional schools and/or the first years of higher education. However, there are others which provide training considered fully equivalent to higher education. The same sort of variation in equivalent level also occurs in the case of professional training schools of the security police administration.

Another military training institution which ranks as a fully accredited higher educational establishment is the military academy *(voennaia akademiia)*. The academies, which are maintained by the respective services, have two functions. First, they offer professional military training of 4–6 years' duration for already commissioned company-grade officers (often graduates of the lower-level officers' schools mentioned above), academy training usually leading to field grade promotion. Secondly, they perform the same function as graduate institutions of the United States Military Establishment.

Because of security considerations, official Soviet data concerning the size of the network of professional military schools are extremely scarce. One of the few listings of such facilities, given in the 1957 edition of the *Bol'shaia Sovetskaia Entsiklopediia* (Large Soviet Encyclopedia), enumerates them as follows, as of the fall of 1939: 16 military academies and 6 special military faculties (mainly for engineering and medical training) in civilian higher educational establishments, all primarily for field-grade officer training; 63 ground force training schools for company-grade officers; 32 air force schools for flying, technical, and service officers; and 14 naval officers' training schools.[68] (The 63 ground force, 32 air force, and 14 navy schools were for officer training at the company-grade level. No data were given for training schools at the noncommissioned officer level.) No comparable data have been published for more recent years.

During the late 1920's and 1930's, the Communist Party also operated a network of higher

[68] *BSE–SSSR–1957*, p. 424.

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training establishments regarded as equivalent in level to regular higher education. Some were called "communist higher educational establishments" (*Kom VUZ'y*); others were designated "supreme communist schools of agriculture" (*vysshie kommunisticheskie sel'skokhoziaistvennye shkoly*, or *VKSKhSh*). The latter trained primarily administrative and managerial personnel for agriculture, while the former trained both party functionaries and managerial personnel. Both these types of establishment were discontinued shortly before the war, but the party still continues to operate a "Higher Party School" (*vysshaia partiinaia shkola*), which is an accredited higher educational establishment. Although referred to in the singular, the school is actually a network consisting of about a dozen units scattered about the country. It is under the jurisdiction of the party Central Committee and trains various kinds of party functionaries and persons selected for party jobs from among leading industrial and agricultural personnel. Party membership is a requirement for admission. In addition, the Central Committees of the union republic Communist Party organizations maintain counterpart schools on the republic level.

There is still another group of special institutions providing training regarded as equivalent to regular higher education. These are the industrial, managerial and trade union academies (*promakademii*). There was a large network of these facilities in the 1930's, but their number decreased after the war, and only about half a dozen are still known to exist today. These academies offer training courses of 2 to 4 years for high-level industrial management personnel, and are operated by various ministries and administrative agencies, as well as by trade unions. Information on financing in 1957 indicates that there was a substantial cut either in the number of these academies or the scope of their activities.[69]

Although the party and managerial training facilities described above are regarded as equivalent to regular higher educational establishments, they are the only institutions on this level which do not require certification of completion of secondary schooling for admission. At the same time, however, they are most restrictive in the selection of candidates, particularly stressing party loyalty and standing, past performance record, etc.

No references are made to military, party, or managerial training establishments in the educational reform laws.

4. *Advanced Training-Research and Degrees*

In the Soviet educational system, two advanced academic degrees—candidate (*kandidat*) and doctor (*doktor*)—are conferred in some 18 diverse fields of knowledge. Whereas in the American academic system advanced degrees are earned through a program of formal postgraduate study involving examinations and the writing of a thesis, and are generally sought as a prerequisite for teaching and research, Soviet advanced degrees are conferred in recognition of actual teaching or research performance, and as a rule are concomitant with such activity rather than a prior qualification. This difference in the function of postgraduate degrees in the two settings accounts for significant differences in the nature of advanced educational activity itself.

Admission to training-research for advanced degrees is largely restricted to persons who are already engaged professionally in academic teaching or scientific research, although less frequently those who are preparing to enter these fields are also accepted. In both cases, however, they must have completed higher professional education and possess diploma certificates to this effect. Until 1956 two levels of training-research programs were offered for advanced degree candidates: the *aspirantura* and the *doktorantura*. The latter has since been discontinued, although the doctor's degree is still awarded. Both programs were of individual advisory-guidance type involving no formal course requirements, the candidates merely being registered at a certain academic or research institution. The candidates perform required research and prepare for their advanced degree examinations. The period of training for the

[69] Ministerstvo Finansov SSSR; Biudzhetnoe Upravlenie (Ministry of Finance of the U.S.S.R.; Office of the National Budget), *Raskhody na sotsial'no-kul'turnye meropriiatiia po gosudarstvennomu biudzhetu SSSR. Statisticheskii sbornik* (Expenditures for Socio-Cultural Undertakings in the State Budget of the U.S.S.R. Statistical Handbook), Moscow, 1958, p. 19, indicates a cut in appropriations to run these schools from 56 to 10 million rubles.

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aspirantura theoretically does not exceed 3 years, and for the *doktorantura,* while it was in existence, 4 years.

Advanced training-research programs are conducted both by higher educational establishments and by various research institutes which offer training exclusively at the advanced level. Applicants are selected on a competitive basis involving some examinations, but the decisive criterion is the individual applicant's past record of academic or research performance. Degrees may be awarded either on the basis of the completion of research in the advanced training-research program, or for some notable scientific achievement or published work entirely unconnected with the organized programs. In actual practice, the majority of advanced degrees in the U.S.S.R. are conferred on the latter basis, the recipients either having never participated in an *aspirantura* program or receiving their degrees many years after such participation. It should be noted also that advanced degrees have been conferred in the U.S.S.R. only since 1934, although the system of advanced academic training has been in operation since 1925 (see ch. V for further details).

In theory, the candidate and doctoral degrees are sequential, and if obtained via participation in regular advanced training-research programs, the candidate degree must precede the doctorate. In practice, however, a large proportion of doctorate recipients have never previously taken a candidate degree; and doctorates are often awarded on the basis of merit, e.g., a dissertation of high quality or outstanding work, by-passing the candidate degree. Persons who complete *aspirantura* training or intend to seek a candidate degree without taking such training are required to pass an examination (candidate minimum), after which they are allowed to work on a thesis. Upon completion, they must publicly defend the thesis before special boards of examiners and official opponents.

Soviet advanced degrees are not conferred by the academic institutions or research establishments themselves. The latter present their recommendations for degree awards to the Supreme Attestation Commission *(Vysshaia Attestatsionnaia Komissiia,* or *VAK),* a special unit attached to the Ministry of Higher and Secondary Specialized Education, which is the actual conferring authority. In the case of candidate degrees, the *VAK* automatically acts on the recommendations of the higher educational or research establishments, but it makes its own accreditation of all doctoral degrees.

Higher educational establishments and research institutes also offer extension-correspondence programs of advanced training-research, which are considered equivalent to the regular advanced programs.

It is important to note that only about a quarter of ordinary higher educational establishments are selected to offer *aspirantura* training or to receive advanced degree dissertations. Similarly, only some research institutes, operated originally either by various ministries and now by regional economic councils and various state committees, can engage in advanced degree training and accept dissertations. This also applies to the research institutes of the Academies of Sciences and to military academies. The Communist Party also has its own Academy of Social Sciences (*Akademiia Obshchestvennykh Nauk*), which offers advanced degree training for party theoreticians. Before World War II there were two other Soviet institutions concerned primarily with advanced political training. One was the Institute of Red Professors (*Institut Krasnoi Professury*), and the other was the network of institutes of Marxism-Leninism. These have now been discontinued.

There are also advanced training programs which are not intended to result in the awarding of degrees. These include professional qualification improvement courses (*kursy usovershenstvovaniia*), which are given either by higher educational establishments or research institutes on a temporary basis or by special "institutes" set up for this purpose (*instituty usovershenstvovaniia*). Training lasts from 2 months to 2 years, and the programs are available in various professional fields, particularly medicine and pedagogy.

The military academies also offer training programs comparable to the courses for improving professional qualifications. These provide highly specialized training in the different branches and levels of staff work.

The educational reform law alludes to only a few aspects of advanced training. It envisages an expansion of *aspirantura* training of the

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extension-correspondence type, with the more successful students to be transferred to full-time (*ochnaia*) *aspirantura* training. It also prescribes that persons who have completed *aspirantura* training or already hold advanced degrees should be directed not only into teaching and research, but also into employment in industry. The reform measures also stipulate a further expansion of qualification improvement programs.

5. *Summary of Changes in the School Structure*

A summary comparison of the major components of the pre-1958 and postreform Soviet educational structures is presented below:

School level and category	*Prereform structure*	*Postreform structure*
1. Preschool level	Creches and nursery schools.	Consolidated preschool child care establishments.
2. Elementary–secondary level		
A. General education and equivalents.	Elementary or 4-year school.	(Transitional 4-year school in rural areas only.)
	Junior secondary or 7-year school (not considered terminal).	Incomplete secondary general labor or 8-year school (considered terminal as far as compulsory education is concerned).
	Senior secondary or 10-year school (terminal as far as compulsory education is concerned).	Complete secondary general labor or 11-year school (upper 3 grades not compulsory).
	Maturity certificate	Certificate of secondary education.
	No separate unit (only 10-year school).	Secondary general labor or 3-year secondary school (grades 9 to 11) as separate unit.
	Part-time schools for working and rural youth (not incorporated as major form of secondary education).	Evening or alternating-shift secondary school (grades 9 to 11, with preparatory) (fully incorporated as major form of secondary education).
B. Vocational–technical education.	Vocational, trade and technical schools of the State Labor Reserve Administration (intake from grades 5 to 7 ordinarily).	Rural and urban vocational-technical schools (intake largely from 8-year school graduates).
	On-the-job training courses.	On-the-job training courses.
C. Secondary specialized education.	Secondary semiprofessional schools (for 7-year graduates).	Regular secondary semiprofessional schools (for 8-year graduates).
	Advanced secondary semiprofessional schools (for 10-year graduates).	Advanced secondary semiprofessional schools (for 11-year graduates).
	Secondary-level military and Communist Party schools.	Secondary-level military and Communist Party schools.
3. Higher education	Universities and institutes providing 2 to 6 years of training in professional fields (direct access by 10-year graduates). Three distinct types of programs: full daytime, evening and extension-correspondence.	Universities and institutes providing 4 to 6 years of training in professional fields (except for selected fields in mathematics, sciences and engineering, access by 11-year graduates *after* employment experience). Separate evening and extension-correspondence programs retained, but full daytime program to become alternating with other two types.
	Higher military, Communist Party, and managerial training schools.	Higher military, Communist Party, and managerial training schools.
4. Advanced training-research and degrees.	Selected higher educational establishments and research institutes: *Aspirantura* training of regular and extension-correspondence type.	Selected higher educational establishments and research institutes: *Aspirantura* training of extension-correspondence type initially, with subsequent transfer to regular type.
	Candidate degree.	Candidate degree.
	Doktorantura training (before 1956).	No *doktorantura* training.
	Doctor degree.	Doctor degree retained.
	Advanced courses for improvement of qualifications.	Advanced courses for improvement of qualifications.

Under the prereform educational system, students progressed through regular elementary, secondary, and higher education generally as follows: Pupils entered elementary school at age 7 and, if normally promoted through all grades, completed regular 10-year school at age 17. Less fortunate or less competent pupils were diverted from regular school in the intermediate grades (5-7) and channeled into skilled labor training schools, leading to employment at age 14 to 16. As an alternative to regular upper-secondary schooling, the student might enter

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secondary specialized or semiprofessional training, leading to employment at age 16 to 19. The transfer of a student from regular school to a skilled labor training establishment, or the suspension of his regular education for any other reason, did not entirely eliminate his chances of acquiring further secondary education, which could be obtained by making use of alternative educational facilities.

Certified completion of secondary education was a prerequisite for all types of higher education. If a student went straight through regular 10-year schooling, he might enter a higher educational establishment at age 17 or even younger and complete it at age 21 to 23. Sometimes immediately upon graduation from a higher educational establishment, but more frequently after a few years of professional experience, a person might enter an advanced training-research program lasting anywhere from 3 years on, possibly receiving an advanced degree. There were also numerous facilities offering extension-correspondence and special training programs officially considered equivalent to regular higher education; through these facilities a student could, with much delay, acquire education up to a desired level.

Under the postreform educational structure, students will progress through the various levels of schooling generally as follows: School attendance will still begin at age 7 and will continue through 8-year general labor school, with the student finishing at age 15 if successful in all grades. For the majority of students, 8-year school will be terminal; however, some will be admitted to 3-year secondary general labor school (with 2 days' employment per week), and those who enter fulltime employment still can obtain secondary education by enrolling in alternating-shift secondary schools (with concurrent fulltime employment). Those attending the former can expect to obtain certificates of completed secondary education at about age 18; the latter, at some later age. Some students will attend 11-year schools of the complete type (single units having all grades), likewise obtaining secondary graduation certificates at 18. A significant proportion of 8th grade graduates, however, will attend none of these upper-secondary schools; rather they will be siphoned off into rural or urban vocational-technical schools, resulting in their employment as skilled labor at age 16 to 18. As an alternative to regular 3-year secondary school, some 8-year school graduates may be admitted to secondary semiprofessional training establishments, but priority will be given to those who since graduation have been gainfully employed for several years. Such semiprofessional training will lead to employment at age 17 to 20 (or even later in the case of those with prior active employment). Those channeled into vocational-technical schools will be able to regain access to regular higher education by completing their secondary general education through attendance in alternating-shift secondary schools.

Completion of secondary (11-year) education, or its alternative, semiprofessional training, will be a prerequisite for admission to all types of higher education. In addition, however, 11-year graduates except in the priority fields of mathematics, science, and engineering, will not be admitted directly to higher education, but only after they have engaged in gainful employment for at least two years. Those admitted directly (at age 18) will graduate at age 24 since all of the priority fields just mentioned have 5½- to 6-year programs. Those entering higher education after an interval of employment will usually be 20 years old or older at entry. The majority of males, however, will have to do military service; and hence may graduate at age 24 to 26, depending upon the length of training in their particular field of specialization. Those entering evening or extension-correspondence programs of higher education will, of course, remain continuously in one of those types of programs, but even full daytime students will be required to alternate periods of regular daytime instruction with periods of evening or extension-correspondence study concurrent with full-time employment.

Recipients of higher education diplomas may enter advanced-degree training-research usually only after a 2-year period of practical professional experience. Initially, such programs will be predominantly of the extension-correspondence type, with subsequent transfer to full-time regular training. In addition to all this, there will be a greatly expanded variety of "alternative equivalents" to formal education.

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6. *Comparison of United States-U.S.S.R. Educational Effort*

Inevitably the issue arises as to the overall quantitative dimensions and comparability of American and Soviet educational efforts. How does the Soviet educational process compare with that in the United States on an age basis? Children in this country start elementary school at age 6 and complete senior high school at age 18. College usually takes 4 years, the student thus graduating at age 22. Those who desire to proceed straight through the whole process can do so without interruption by involuntary diversion into employment. This may be followed by postgraduate study for a higher degree, usually taking from 1 to 4 or more years, depending on the level of the degree and other circumstances. The first advanced degree (master's) is generally considered essential for professional standing, while the second (doctor's) is usually a prerequisite for advanced teaching and research. In terms of the overall length of the educational process, the American system covers about the same number of years (16-17) as the Soviet, under either the pre-1958 (15) or the new postreform (16-17) structure. In terms of the correlation of age to school level, there was also a close parallel between the American and the prereform Soviet systems, but the postreform Soviet structure will give the American system an age advantage of 2 or more years at levels beyond the secondary.

The general performance of the educational systems in the two countries can be examined in quantitative terms only in its relationship to respective groups of population. Since enrollments vary from year to year and the age groups of those attending school also change, the evaluation of the performance of educational systems cannot be viewed in a static way but must be looked upon only as an approximation of the existing trends. Such a comparison, based on 100 units, is made in table I–1.

These data indicate radical differences in the orientation of the educational effort in the two countries. The U.S.S.R. has been operating a much more selective educational system on all levels beyond the elementary, with far fewer students in the respective age groups gaining access to education on the secondary and higher levels.

TABLE I–1.—*Quantitative index of performance of educational systems in the United States and the U.S.S.R. in the 1950's*

United States		U.S.S.R.
100.....	Base *.....	100
99.....	Complete elementary schooling....	98
85.....	Enter high (upper secondary) schools.....	55
57.....	Graduate from (complete) general secondary education.....	30
23.....	Enter institutions of higher education.....	10
12.....	Graduate from higher education...	7

*Hypothetical base refers to the 6- or 7-year-olds in the late 1940's; in the United States, about 2,900,000 in number, in the U.S.S.R., about 4,300,000.

Source: U.S.S.R. data taken from material in chs. II and IV in this volume and from various U.S. Office of Education reports. See also N. DeWitt, "Basic Comparative Data on Soviet and American Education," *Comparative Education Review*, vol. II, No. 1 (June 1958), 9–11.

The Soviet System of Educational Administration and Control

The preceding section has surveyed the complex educational structure of the Soviet Union, with particular reference to how this structure is being modified under the 1958 program of educational reform. It is now necessary to examine the equally complex system of governmental administration, supervision, and control of education—a system which, as will be seen, has many deceptive appearances of decentralization but, in reality, is one of highly centralized coordination and control.[70]

1. *Preschool, Primary and Secondary School Administration*

Now, as before the 1958 reforms, Soviet preschool training facilities and general education schools through the senior secondary level, including the present alternating-shift secondary

[70] There has as yet been no comprehensive Western study of the Soviet system of educational administration. The subject is briefly treated in G. Z. F. Bereday, "Changes in Soviet Educational Administration," *School and Society*, vol. 86, No. 2124 (Jan. 18, 1958), 37–38; *OE–U.S.S.R.*, pp. 20–48; U.S. Department of Health, Education, and Welfare, Office of Education, *Soviet Commitment to Education*, Report of the First Official U.S. Education Mission, Bulletin 1959, No. 16, Washington, D.C.: U.S. Government Printing Office, 1959, pp. 6–9; Bereday, Brickman and Read, *op. cit.*, ch. V.

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schools which are merely the old schools for working and rural youth in revamped form and with a new name, are all under the immediate administrative supervision of the local education offices. These, in turn, are subordinate to regional departments of education, and the latter are subject to the authority of the Ministry of Education in each of the 15 constituent republics of the U.S.S.R. There is, however, a variation of this standard pattern in the Russian Socialist Federated Soviet Republic (RSFSR), which itself embraces a number of so-called "autonomous republics," each having its own Ministry of Education but with all these "ministries" subordinated to the RSFSR Ministry of Education and therefore on the same administrative level as the regional education departments in the other nonfederative constituent republics.

There is no central all-union ministry in charge of elementary and secondary-level education, the Ministries of Education of the 15 constituent republics theoretically being the highest-level administrative organs in this area of education. The individual ministries issue detailed regulations governing curricula, textbooks, and methods of instruction. They supervise the allocation of budgetary funds, the carrying out of new school construction, and capital repair and maintenance. They appoint teaching personnel and supervise teacher training. And finally, through a system of school inspectors, they keep continuous check on the quality of instruction and adherence to prescribed directives and regulations in the schools.

Soviet descriptions of the functioning of local organs of educational administration indicate that they actually wield no autonomous authority.[71] The chief functions of the local or district offices of public education (*Raionnyi Otdel Narodnogo Obrazovaniia–RONO* or *RAIONO*) have to do with (*a*) the preparation of individual school budgets; (*b*) estimating enrollment, staffs, and volume of school facilities needed; and (*c*) maintaining a staff of school inspectors to see that individual schools and teachers conform to directives from the republic Ministries of Education. Thus the *RONO* acts largely as a local agent of the republic Ministry of Education in exercising control over the work of the schools, rather than as an initiator of action in the interest of the local community. The *RONO* is the lowest level unit of educational administration, and above it are the city (*GorONO*), regional (*OblONO*), or provincial (*KraiONO*) education departments, which function on the administrative level just below the republic Ministries of Education. But all these lower level organs are merely administrative agencies of the republic ministries. Local control of education, such as exists in the United States, is entirely alien to the U.S.S.R.

Centralization, moreover, does not stop at the republic level. For while the 15 republic Ministries of Education, as quasi-independent administrative hierarchies, issue orders, directives, and regulations and enforce their execution, they do so only in implementation of basic decrees or laws emanating from the Council of Ministers of the U.S.S.R. The latter, in turn, usually only ratifies and executes policy directives and proposals of the Central Committee of the Communist Party. (Some major laws, such as the educational reform law, are further ratified—more or less automatically—by the Supreme Soviet.) Furthermore, the party Central Committee, which has a special Section on School Affairs, from time to time issues educational directives which are directly binding upon the republic ministries. Finally, the Ministry of Education of the RSFSR practically sets the pattern for the other republics to follow in issuing detailed ordinances, regulations, and clarifying directives implementing the decrees of the U.S.S.R. Council of Ministers and directives of the party Central Committee. Through its Administration on Instruction and Methodology (*Uchebno-Metodicheskoe Upravlenie*) and the RSFSR Academy of Pedagogical Sciences (*Akademiia Pedagogicheskikh Nauk RSFSR*), the RSFSR Ministry of Education plays a key role in formulating model standards in regard to school curricula, textbooks, teaching methods, examinations, etc. The RSFSR Academy of Pedagogical Sciences is also the major curricular research center of the U.S.S.R. It works out standard syllabi and approves the textbooks for most instruction subjects to be used in all schools

[71] A. V. Luzhin, *Rabota raionnogo soveta v oblasti narodnogo obrazovaniia i kul'tury* (Work of the Regional Soviets in the Area of Public Education and Culture), Moscow, 1957, p. 13.

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throughout the country. Several Ministries of Education in other republics have pedagogical research institutes, which adapt centrally prescribed programs of instruction to local conditions, primarily adjusting programs to the linguistic peculiarities of a given republic. The Ministries of Education of the other republics follow the pattern of the RSFSR Ministry of Education, making only minor modifications to suit local conditions. This was well illustrated by the manner in which the educational reform law itself was implemented. The RSFSR Ministry of Education promulgated revised curricula, school programs, textbook regulations, etc., based on the reform law in the summer of 1959. During the fall the Ministries of Education of the other republics worked out and issued their own revised educational regulations based on this model.

2. *Supervision of Vocational and Skilled Labor Training Programs*

The administrative pattern for establishments providing both formal and on-the-job training for skilled and semiskilled labor differs from that for the regular schools. The former establishments are supervised in some cases by the ministries in charge of different branches of the economy or of certain industries. In other cases involving training conducted by enterprises which have been transferred under the control of the regional economic councils (*sovnarkhozy*), administrative supervision is exercised by the individual economic council directly concerned. Various labor training schools and on-the-job apprenticeship courses are administered directly by local economic units, plants or enterprises, which in turn clear their training programs with the *sovnarkhoz* or the appropriate economic administration. Formerly, a large group of factory schools (*FZO*), trade schools, and vocational-technical training facilities was administered by the Main Administration of the State Labor Reserve, attached to the U.S.S.R. Council of Ministers. This central agency prescribed the types and length of training, saw to the financing of the programs, and supervised the draft of students. It has now been superseded by the State Committee of the U.S.S.R. Council of Ministers on Vocational-Technical Education, which however will be charged only with overall planning and program formulation. Administrative supervision and control of rural and urban vocational-technical schools will be entrusted to republic committees (or councils) on vocational-technical education. These committees, within the framework of the overall plans and policies fixed by the central State Committee, will decide enrollment quotas, specific programs, and all fiscal and staffing problems. However, actual day-to-day administration of the schools will be delegated by the committees to the appropriate regional economic councils.

3. *Control over Special-Purpose Schools*

Military security police (KGB and MVD), Communist Party, and managerial training establishments are under the control of the respective administrative hierarchies concerned, which in turn are directly subordinate either to the U.S.S.R. Council of Ministers or to the Central Committee of the Communist Party.

4. *Administration of Secondary Semiprofessional and Higher Professional Education*

Secondary semiprofessional training establishments formerly were under the administration of various economic ministries so far as operation and financing were concerned, but were under the Main Administration of Secondary Specialized Education, a division of the All-Union Ministry of Higher Education, with respect to curricula, training programs, textbooks, methods of instruction, enrollment quotas, etc. In 1957, when many of the economic ministries were abolished and the regional economic councils established, a majority of the secondary semiprofessional schools operated in conjunction with industrial enterprises were transferred, along with the enterprises, to the administrative jurisdiction of the appropriate economic councils. Like the old economic ministries, however, the councils administer only the operation and financing of the schools, and administrative authority over planning and substantive educational policies is now divided between organs of the central government and of the republics. The present allocation of authority results from the administrative re-

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organization affecting higher and secondary specialized education, decreed in June 1959. At that time, the former Ministry of Higher Education was redesignated the Ministry of Higher and Secondary Specialized Education, and this central ministry was vested with administrative control of overall planning and policy coordination for both higher and secondary specialized education, while administrative authority over detailed implementation of plans and policies was vested in counterpart ministries or state committees to be established at the republic level. (Ministries which exist at both the all-union and republic levels are termed "union-republic" ministries.)

The All-Union Ministry of Higher and Secondary Specialized Education is, of course, similarly responsible for top-level planning, policy coordination, and control in the area of higher education, including professional and advanced-degree training and research.[72] It determines the overall program of higher educational activity and lines of specialization, and it also exercises final control over teaching staff accreditation and appointments, enrollment quotas, textbooks, and methods of instruction. Administrative authority in matters of implementation, in accordance with the June 1959 decree, is delegated to the counterpart ministries or state committees of the various republics.[73]

It is important to note that the June 1959 reorganization of the administrative structure for higher and secondary specialized education was officially represented as a move to decentralize control of these areas of education by placing greater authority in the hands of the republics. The reorganization decree, as announced by the U.S.S.R. Council of Ministers on June 27, 1959,[74] specified that the republics should establish ministries or other appropriate administrative organs (state committees) to supervise higher educational establishments and secondary specialized schools, and that these organs would be empowered (*a*) to study demand conditions for specialized manpower; (*b*) to organize the work of such educational establishments; (*c*) to supervise scientific and research activity by them; and (*d*) to administer the required material-technical supply, financing, and construction of facilities. The functions of the all-Union Ministry of Higher and Secondary Specialized Education, according to the decree, would be (*a*) to assist and coordinate the activities of the republic organs of administration; (*b*) to provide general direction and methodological guidance for higher educational establishments, and to coordinate their scientific research activity; (*c*) to coordinate the production and supply of textbooks and teaching aids; and (*d*) to certify and accredit academic and research personnel.

Despite the delegation of certain administrative functions to the republic ministries or state committees, however, the purported decentralization of control over higher and secondary specialized education is more illusory than real. The explanation for this lies in the fact that the most important effect of the 1959 reorganization was to lessen the dispersion of administrative control over the large number of specialized training facilities which were (and still are) maintained and operated by economic

[72] There had been numerous changes in the central administrative organization in charge of higher education prior to the reorganization of June 1959. These may be summarized as follows: (1) Prior to 1932, there was a decentralized pattern of administration, but the overall coordination was effected through the Section on Training of Cadres of the Gosplan; (2) 1932–36—administration called *VKVTO* (All-Union Committee on Higher and Technical Education) under the Central Executive Committee; (3) 1936–46—administration called *VKVSh* (All-Union Committee on Higher Education) under the Council of People's Commissars; (4) 1946–53—All-Union Ministry of Higher Education (called *MVO*); (5) 1953–54—Main Administration on Higher Education of the Ministry of Culture of the U.S.S.R.; (6) 1954–55—All-Union Ministry (*MVO*); (7) in the spring of 1955, reorganized into the union republic Ministry of Higher Education.

[73] The republic ministries or state committees which have been reported to date as in operation are as follows: State Committee on Higher and Secondary Specialized Education of the Uzbek SSR: Chairman T. M. Sarymsakov (*Pravda vostoka*, Aug. 30, 1959); Ministry of Higher and Secondary Specialized Education of the RSFSR: Minister V. N. Stoletov (*Izvestia*, July 30, 1959); Ministry of Higher and Secondary Specialized Education of the Ukrainian SSR: Minister Iu. N. Dadenkov (*Rabochaia gazeta*, Feb. 23, 1960); State Committee on Higher and Secondary Specialized Education of the Estonian SSR: chairman not announced (*Sovetskaia Estonia*, Aug. 2, 1959); State Committee on Higher and Secondary Specialized Education of the Armenian SSR: Chairman B. G. Martirosian (*Kommunist* [Armenia], Sept. 2, 1959); Ministry of Higher, Secondary and Vocational-Technical Education of the Belorussian SSR: chairman unknown, Deputy Chairmen N. I. Krasovskii and V. T. Petrikov (*Sovetskaia Belorussia*, Aug. 26, 1959); State Committee on Higher and Secondary Education of the Kazakh SSR: Chairman: K. Bilialov, who visited the U.S. in March 1960 (*Kazakhstanskaia pravda*, Aug. 21, 1959). There may be other state committee units in operation, but they have not been disclosed in the Soviet press, at least up until mid-1960.

[74] *Izvestia*, June 27, 1959.

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enterprises or organizations, and which previously were under the direct administrative jurisdiction of diverse economic ministries or of the regional economic councils. There were over 500 such establishments, accounting for approximately two-thirds of the total enrollment in higher educational and secondary specialized training institutions. Under the reorganization, these are brought together under the immediate supervision—in all matters pertaining to their educational functions—of the republic administrations for higher and secondary specialized education, all of which are in turn subject to the central authority of the All-Union Ministry of Higher and Secondary Specialized Education.[75] Thus, there has been a consolidation, rather than a decentralization, of central administrative control.

Certainly the new administrative structure involves no increase in the autonomy of individual higher educational establishments. Now, as in the past, these establishments have no right to alter their teaching staff, training programs, enrollment quotas, physical facilities, or any "capital stock" implements of teaching and research. All major questions are decided centrally, all senior appointments are confirmed centrally, all capital budgets are decided centrally, by the Ministry of Higher and Secondary Specialized Education, and are subject to verification and confirmation by the State Planning Committee and (in all budgetary matters) by the Ministry of Finance. Such "autonomy" as can be said to exist is confined to minor details such as the scheduling of instruction and other matters of curriculum implementation, maintenance problems, etc. Perhaps the only recent innovation in this area is the permission given to large schools to participate in contractual research with various economic enterprises or other research and development organizations—subject, however, to prior approval by the Ministry of Higher and Secondary Specialized Education in each individual case.

It is obvious, therefore, that the All-Union Ministry, either through comprehensive top-level supervision of all aspects of administration or, in some cases, through centralized coordination and supervision of all aspects concerned directly with the process of instruction, controls the formal training of professional and semi-professional personnel in the U.S.S.R. This ministry, like any other in the U.S.S.R., issues scores of ordinances and operational directives, all of which are designed to implement the educational policies decided by the Central Committee of the Communist Party and the U.S.S.R. Council of Ministers.

5. *Control over Advanced Training and Degree Awards*

In addition to the supervision and overall planning of higher education, the Ministry of Higher and Secondary Specialized Education has retained one of its most important weapons of control—the power of selecting higher educational establishments, as well as all other research establishments (such as the research institutes of the Academy of Sciences of the U.S.S.R. and other Academies of Sciences, and technological research and development institutes operated by various economic agencies) to engage in advanced training-research. This power is vested in the all-important Supreme Attestation Commission (*VAK*) attached to the All-Union Ministry of Higher and Secondary Specialized Education. The *VAK* grants permission to higher educational establishments and research institutes to engage in advanced training and to conduct public defense of advanced degree dissertations. It reviews the decisions of these establishments as to the award of candidate degrees and itself decides the award of doctor degrees as well as appointments to advanced academic rank (professor, associate professor, senior researcher). It designates the fields in which each institution may conduct advanced degree training and accept dissertations. It may also revoke an advanced degree or advanced rank certification. In addition, the *VAK* is a central office where personnel files on all recipients of advanced degrees and all advanced academic teaching and research personnel are kept and processed for appointment, transfer or reappointment purposes.

Advanced degree training-research is, furthermore, related to the overall research effort of the U.S.S.R., for many of the thesis topics (or

[75] Still headed by Minister V. P. Eliutin. His deputy, V. N. Stoletov, has become Minister of Higher and Secondary Specialized Education of the Russian SFSR.

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research performed prior to its incorporation as a thesis or other accreditation material, i.e., articles, books, reports submitted in its stead) are undertaken either by active researchers or under the direct and personal supervision of research and academic personnel already engaged in research. In this way advanced training is fitted into the overall national pattern of research activity and thus constitutes an effort coordinated under the respective institutional jurisdictions (particularly in research establishments) of the appropriate hierarchies which supervise research activity (see further discussion in ch. V).

It is evident, also, that all the seemingly independent channels of Soviet authority which converge at the apex of the bureaucratic pyramid are not the only guarantee of effective central control. In every Soviet educational institution the party maintains its local cells; subdivisions of the Ministry of Finance control the budgets of educational establishments; the KGB (MVD) maintains security surveillance; the State Planning Committee controls various aspects of educational planning; regional units of the Central Statistical Administration check on the compilation of various school statistics, etc. Through these multiple interlocking instruments of control, Soviet education is fully integrated into the bureaucratic administrative machinery of the Soviet state.

This section has described the main features of the Soviet system of educational administration. The radical differences between it and the administration of education in West European countries or the United States are obvious. In the Soviet Union, important educational policy decisions are taken *not* by individual educational establishments, but by central organs of the party and the Government. Although in some West European countries (and also in pre-Revolutionary Russia) there are national administrations of the educational system, many institutions, particularly on the university level, enjoy autonomy in selecting their staffs, instruction programs, and students, such autonomy does not exist in the U.S.S.R. today. The entire educational system and particularly higher education institutes are regulated by decrees of the Central Government. Individual educational establishments enjoy only limited autonomy even in their day-to-day operational decisions, for these decisions merely implement specific aspects of educational policy as determined at the center. The overall educational effort is centrally coordinated and centrally controlled.

6. *Trade Union of Educational and Research Employees*

There used to be two independent educational trade unions: the Trade Union of Educational Employees of union republics (mostly primary and secondary education employees) and the Trade Union of Employees of Higher Education and Research Establishments. On August 19, 1957, these were merged into a single Trade Union of Employees of Educational, Higher Educational, and Research Establishments of the U.S.S.R.[76]

The total membership at present is approximately 4 million composed of teachers, researchers, and clerical and service personnel. Thus it is not a professional association, but includes all types of employees connected in any way with education, from scrub women to university rectors and members of the Academy of Sciences of the U.S.S.R.

Trade union activities are concentrated primarily on welfare and recreation fields.[77] Union dues are used to support various clubs, sports activities, and rest homes. The trade union, together with the RSFSR Ministry of Education, publishes the major Soviet educational newspaper, *Teacher's Gazette* (*Uchitel'skaia gazeta*), which appears three times a week and has a circulation of about 600,000.

The Communist Party and the Educational System

As the repository of supreme authority in the Soviet system of totalitarian one-party dictatorship, the Communist Party of the Soviet Union exercises complete control, both direct and indirect, over every aspect of Soviet education from

[76] Malin, *op. cit.*, pp. 536–537.

[77] For a more complete discussion, see Bereday, Brickman and Read, *op. cit.*, pp. 308–316.

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the determination of overall policy to the day-to-day functioning of the schools. It is the purpose of this section to review in brief the essential features of the mechanism of party control.

The Communist Party's central organs directly formulate basic educational policies covering types of schools, curricula and programs, instructional methods, schooling requirements, etc., and oversee their enforcement. These policies are generally embodied in resolutions or directives which emanate originally from the party's Central Committee and then are formally promulgated as decrees or "laws" of the Council of Ministers of the U.S.S.R., with or without subsequent "rubberstamp" ratification by the Supreme Soviet. It should be emphasized, however, that while decrees are often issued jointly in the names of the Central Committee and the Council of Ministers, or of the Council of Ministers alone, the Central Committee is not merely a "cosponsor" or "cosigner" of all major legislation. On the contrary, the Central Committee's directives are automatically binding upon the Council of Ministers and the individual executive departments of the government, all of which are headed by ranking party officials. The function of the governmental organs is solely to promulgate the party's decisions in "legal" form and to execute them through the state administrative machinery.

Thus, the party is the originator of educational legislation. The establishment or closing of schools, universities, and research institutes, as well as the creation of the governmental organs of educational administration and the appointment of their heads, are matters of prior or concurrent decision by the party. Documentation on this score is scarcely necessary but is readily available in thousands of references in Soviet official sources.[78]

Failure to appraise realistically the role of the Communist Party in the formulation of Soviet educational policy leads to another misconception. The view has occasionally been advanced that educators in the Soviet Union have a greater voice in matters of public education than in the United States for example. Such opinions have been voiced by some observers of Soviet affairs, but more especially by recent visitors to the Soviet Union. This misconception is largely due to confusion concerning what is meant by "role." Indeed, Soviet educators, administrators, teachers and curricular specialists have a greater voice in regard to the *implementation* of educational policy, but on the other hand they have very little to say and no power whatever—save that of suggestion—insofar as the determination of basic educational policies is concerned. These policies are decided by the practicing politicians currently sitting in the Presidium of the party Central Committee. Soviet educators may debate, discuss, propose, or suggest what a certain aspect of educational policy should be, and some of their views are undoubtedly heard and sometimes considered by the political officials on the policymaking level, but educators have absolutely no power of policy decision. Once policy is decided, then and then only do the educators have a measure of influence over details of implementation. It is in this way that Soviet education is integrated into overall social and economic planning and its tasks determined so as to serve the planned social and economic objectives of the state.

The differences between the Soviet and American setting concerning jurisdiction over the educational system are important. In the United States many educational decisions are also made by political boards. These are freely elected laymen on boards of education and State legislatures who participate in decision-making as to how much should be spent on education, what schools should be built and even what curricular requirements should be established. The teaching profession in the United States enjoys perhaps greater autonomy in conducting classroom work. In the Soviet Union it is the content of education and teaching practice which are centrally prescribed. Thus the central issue in assessing the differences in educational decision-making is not only between the roles of political vs. educational specialists, but also that of a highly centralized vs. a highly diffused political system of control over educational policies.

In addition to formulating broad policy decisions, the Communist Party exercises day-to-

[78] One of the most recent surveys on this subject is J. Pennar, "Party Control over Soviet Schools," in Bereday and Pennar, *op. cit.*, pp. 45–46.

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day supervision over their execution. The mechanics of this process are complex, but the underlying principle of party penetration in all affairs of school and education is simple.

One of the main departments of the Central Committee of the Communist Party is its Department on School Affairs, Higher Education, and (Scientific) Research (*Otdel Shkol, VUZov i Nauki*). The present (1960) head of this division is V. A. Kirilin, who served earlier as Deputy Minister of Higher and Secondary Specialized Education of the U.S.S.R. Counterparts of this department exist in the party central committees of the individual union republics as sections on schools, higher education, and research, and the party committees at the regional, city, and district levels all have corresponding "offices." In simple terms, these offices supervise what goes on in every educational establishment, report it to the higher level party organs, and initiate whatever action they deem advisable.

In higher education, for example, there is a series of links between the Communist Party organization and individual higher educational establishments. On the lowest level, the city or regional party committees have their own appointed functionaries who are specially assigned to maintain contact with the party locals in individual higher educational establishments.[79] The individual city or regional party committees also commonly appoint a special full-time party functionary, called an "instructor," who exclusively handles the affairs of one or several higher educational establishments. This "instructor" keeps the party secretary of the city committee informed about the activities of the party locals in higher educational establishments proper, prepares "case" reports on particular occurrences, and suggests measures for handling them. In addition, the "instructor," under instructions from the city party committee or as part of his normal functions, suggests, directs, and organizes meetings, discussions, or other activities in the party locals of individual higher educational establishments.

It is important to note that there are various gradations and ranks of "instructors" and "party organizers" (*partorgi*). From 1949 until 1956 the most important offices, plants, higher educational establishments, research institutes, etc., were directly supervised by party organizers appointed by the Central Committee, with the title of "*partorg TsK KPSS*" (party organizer of the Central Committee of the Communist Party of the Soviet Union.[80] With the strengthening of the regional party organizations under Khrushchev, the need for such a direct top-level link diminished, and party organizers and "instructors" apparently are now appointed by the republic or regional party offices.

The party local to which primary and secondary school teachers, supervisors, and maintenance personnel may belong is the lowest link in the system of party control over education. It is usually required that a school director be a party member, but in any case appointments to such positions must be approved by the regional party committee.[81] The party locals in individual schools may have anywhere from 3 to 30 members, depending upon the size of the school. In case the number of party members in a school is very small, as in rural areas, several schools are sometimes combined into one local, which holds party meetings as a single unit. The party local has an elected secretary and a *biuro* (a board of several members). The secretary and the board constitute the nucleus of activity and a contact link with the regional committee of the party.

The activities of the party locals include their own meetings, directing other organizations, and carrying out ideological propaganda work. Specific spheres of activity are: (1) party organization work, consisting of discussion of party directives, criticism of school administrative activities, programing other activities, etc.; (2) political work and propaganda, consisting of campaigns to popularize party and governmental decisions not only in the school proper but also among the public; (3) Komsomol and Pioneer work, which constitutes one of the chief activities of the party locals and involves close supervision by a designated party representative of all the activities of these organizations, ranging from

[79] One detailed description of this link appears in I. Raid (Secretary of the Tartu City Party Committee), "Ideinopoliticheskaia rabota v VUZakh" (Political Activity in Higher Educational Establishments), *Sovetskaia Estonia*, June 10, 1958.

[80] Malin, *op. cit.*, p. 429.

[81] See the section on appointment practices in ch. VI.

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lectures to the election of officers; and (4) trade union work, consisting of supervision of the activities of the local unit of the Trade Union of Employees of Educational, Higher Educational, and Research Establishments.

The party local usually holds three general meetings per month. Each member or group of members are assigned individual "activity" items in between meetings. These activity items call for smaller group meetings, which may add up to 15 additional meetings per month. Thus, every other day or so, one or several party members stage or direct some type of party activity. All these party chores are supplemental to teaching duties.

In theory, the statutory rules of the Communist Party do not give to the party the right to control the activities of school administration directly. In practice, however, this provision is reported to be often "forgotten," and the party local bureaucracy and party meetings "discuss and adopt directive resolutions about the activities of school administrators." [82] Moreover, at open as well as closed party meetings,[83] discussions of the work of teachers and of the Komsomol are held and are often critical of individuals. Those criticized sometimes manifest justified resentment along the line of "why pick on me?" [84]

In the primary and secondary school setting, the Communist Party "instructor" serves also as a means of controlling the teaching activity. The job of "instructor" in the city or district party committees involves not only that of liaison work but also acting as an "enforcer of party policy." [85] In one of the districts of Moscow province there are 26 party locals embracing a total of 78 schools, the majority of the local members being teachers. Each local has a secretary. It is interesting to observe what transpired at the local level in connection with carrying out the educational reform. The party "instructor" assembled the party local secretaries for special meetings which discussed and charted a course of action for the local implementation of the school reorganization act, and at which representatives of local industry were present. In this way arrangements for the vocational training of pupils were made directly by the party organization. The "instructor" thereafter devoted his efforts to seeing "that everyone is doing what he should be doing." [86] The party "instructors" are in the employ of their city or district party offices, but the overall supervision of their activity on the provincial level comes under, in the case just described, the Office of Schools and Higher Education (*Otdel Shkol i VUZov*) of the Moscow Provincial Committee (headquarters) of the Communist Party.

All these activities of the Communist Party in controlling education may appear mild enough in a period when no massive political purge is underway. But during the period of bloody political purges in the 1930's, the local party organs, through their "instructors" and organizers, played an instrumental role in the purge of educators from ordinary school-teachers up to university rectors.[87] It should not be forgotten that the Communist Party today penetrates so deeply into the fiber of the Soviet educational system that, if the party leaders should so decide, its machinery could again be used to purge any teacher or professor not willing, at least outwardly, to toe the party line. The fear that this threat inspires is the real source of the party's controlling power, a power which no organizational chart can show.

The Impact of Labor Problems on Educational Reform

The author's basic proposition, namely that the program of educational reform in the Soviet Union is largely a response to needs and forces generated by and within the Soviet economy, has already been stated. This, of course, is not to deny that political, ideological, and social factors also played a part in shaping the reform, but it *is* to maintain that the

[82] V. Afanas'ev and A. Pakhomova, *Partiinaia organizatsiia shkoly* (Party Organization in the School), Rostov-on-Don, 1954, p. 7.

[83] A closed meeting is restricted to party members, and an open meeting is one in which nonparty members may be called upon to participate.

[84] Afanas'ev and Pakhomova, *op. cit.*, p. 5.

[85] *Uchitel'skaia gazeta*, June 11, 1959. The article describes the activity of party instructors in schools in the Moscow province.

[86] *Idem.*

[87] M. Fainsod, *Smolensk under Soviet Rule*, Cambridge: Harvard University Press, 1958, p. 345 ff.

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moving forces stemmed from the economy, and more specifically from its problems in the area of trained manpower supply. An examination of three aspects of the manpower situation in the Soviet economy will serve to clarify the nature of these problems. These aspects are: first, quantitative trends in the supply of manpower; second, qualitative factors of labor productivity; and third, problems connected with the employment of juvenile labor.

1. *Quantitative Trends in the Supply of Manpower*

The influence of postwar demographic trends as a factor in bringing about the educational reform has been briefly touched upon earlier in this chapter, and in chapter II the impact of these trends upon the Soviet school population at different age and grade levels will be examined in more detail. Here, therefore, attention will be focused on the essential facts of the Soviet manpower problem and their relation to the central features of the educational reforms.

In 1959, out of a total population of 208 million, the Soviet Union had about 130 million persons of working age (15–59). Between 70 and 75 percent of these, or 91 to 95 million, were actually gainfully employed, approximately 53 million as workers and salaried employees, and the remaining 38 to 44 million as collective farmers and agricultural laborers. Western estimates published in 1959 placed the anticipated natural increase in the working-age population during the Seven-Year Plan at about 7 million,[88] but the latest Soviet population census (as of January 1959), which was made public early in 1960,[89] indicates that these estimates were much too high, and that the actual increase will probably be less than 4 million.[90] The original cause of this drop in the rate of population growth lies in the severe population losses incurred by the U.S.S.R. in World War II.

The sharp drop in the birth rate caused by the wartime losses affected the school-age population throughout the 1950's and its effects are now carrying over into the working-age population and will continue throughout the 1960's. Briefly, these demographic forces may be summarized, on the basis of the recently announced census figures (see also discussion in ch. II and table II–16), as follows. In 1939 the population of 8–14-year-olds was 37 million. In 1959, however, this age group was reduced to 23,500,000, a decline of 13,500,000. The present deficit of school-age population will perpetuate into the labor force in the early 1960's so that the labor force of working-age population (15–59) will *not* increase appreciably during the current Seven-Year Plan. The situation will ease only toward the end of the 1960's.

How these deficits will affect accretions to the labor force is shown graphically in chart II, which indicates that the early 1960's will be extremely lean years in terms of the supply of young people becoming available for first-time employment in the active labor force (and young males eligible for the military draft). The deficit in rural areas, it should be noted, will be especially acute. This means that the method commonly resorted to in the past for expanding the industrial labor force, i.e., the transfer of rural workers, especially youths, to urban industrial employment, most probably cannot be used in the 1960's except at the cost of depleting the agricultural labor supply below the minimum level required to maintain food production. There is the further problem of a substantial deficit of males (the ratio of males to females is 45:55, resulting in an overall shortage of 21 million males); this condition is most acute in the rural areas, where there is a surplus of 17 million females,[91] and restricts further the

[88] U. S. Congress, Joint Economic Committee, *Comparisons of the United States and Soviet Economies*, pts. I, II, and III, and *Hearings* (November 1959), 86th Cong., 1st sess., Washington, D.C.: U. S. Government Printing Office, 1959, pp. 38, 68, 86. See especially the two research papers by J. F. Kantner and by W. W. Eason in pt. I, pp. 31–94. The working-age population as defined on p. 38 by Kantner refers to ages 16–59 and places the net increment at about 7 million. On p. 68 Eason refers to the working-age population of ages 15–59 with a net increment of about 7.6 million. Another unpublished Western estimate by M. K. Roof, of the Library of Congress, places the net increment for ages 15–59 at 8.6 million.

[89] *Pravda*, Feb. 4, 1960. See summary in appendix table II–A–5.

[90] On the basis of the data in appendix table II–A–5, the gross increment in the population of those aged 15–59 in 1965 will be 7.1 million over that in 1959. This makes no allowance for mortality rates, which if applied would give a net increment of about 4 million.

[91] For further information, see text table VI–43; appendix table II–A–5; and *Narodnoe obrazovanie*, No. 3, 1960, p. 12. The latter source gives ratios of educational attainment by male-female and urban-rural breakdowns, from which the rural-urban population by sex was estimated.

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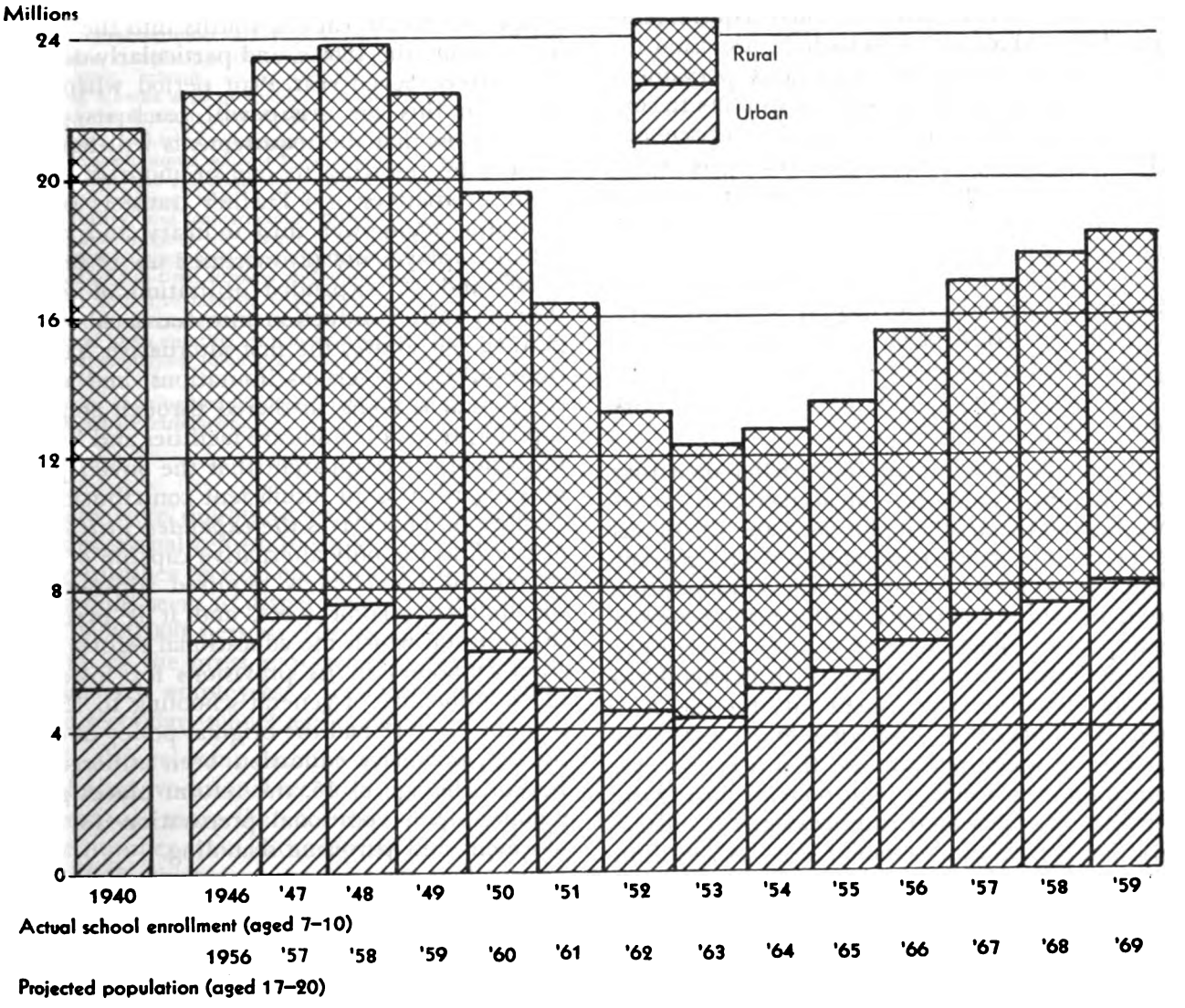
CHART II.—DEMOGRAPHIC TRENDS: SCHOOL ENROLLMENT IN ELEMENTARY GRADES (1–4), 1940, 1946–1959



Source: Appendix table II–A–3. Projected population aged 17–20 is hypothetical, without allowance for mortality rates and without downward adjustment of school cohorts to account for repeaters, overaged pupils and early entrants.

possibility of transferring rural male workers into the industrial labor force.

On the basis of available data, it can be reliably estimated that the cumulative deficit of 18-year-olds over the period of the current Seven-Year Plan (1959–65) will total *at least* 12 million. In other words, by 1965 the contingent of 18 to 24-year-olds in the Soviet population will number only about 20 million,[92] as compared to the 32–34 million which it would normally have been except for the wartime and immediate postwar deficit in births.

[92] See appendix table II–A–4 for detailed estimates of hypothetical 18-year-old groups for the period 1955–67.

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The Seven-Year Plan, however, explicitly calls for substantial additions to the numbers of workers and employees. Requirements are set at 11.5 million.[93] It must be emphasized, moreover, that this figure represents projected *net* additions and not *gross* additional requirements which would also have to include provision for replacements necessitated by deaths, permanent retirements, and withdrawals of workers to continue their educaton, enter military service, etc. The whole subject of labor attrition and turnover and replacement requirements remains, in fact, one of the least developed areas of inquiry into Soviet manpower problems. Since the 1940's the Soviet authorities have been extremely reluctant to provide information, much less any reliable statistical data, concerning labor replacement requirements, and any current analysis of the problem must therefore rely largely upon rough estimates.

It can be ascertained from earlier data that the planning norm for replacements of Soviet workers and salaried employees in the 1930's was 3 percent or more per annum.[94] The present study provides statistical verification of an attrition rate for professional and semiprofessional manpower ranging between 3 and 5 percent per annum,[95] and it would not be unreasonable to assume that the replacement rate for the category of workers and salaried employees runs at least as much per annum. If this is the case, minimum replacement requirements during the 1959–65 period would run between 1.6 and 2.1 million per annum, or some 11.2 to 14.7 million for the total 7-year period. Since the projected *net* addition has been fixed at 11.5 million, it thus seems indicated that replacement requirements will at least equal, and probably exceed, the net additional requirement; and that the gross additional requirement for this one segment of the overall Soviet work force will be around 23–25 million for the 7-year period. The question is: Where do the Soviet economic planners expect to obtain this huge increment to the industrial labor force?

It has already been shown that the demographic trend factor rules out the possibility of meeting these requirements through the normal flow of 17- to 20-year-old youths into the labor force during the 1960's, and particularly during the current Seven-Year Plan period when the deficit in this age group will reach its peak. This means that the requirements will have to be met by resorting to one or more of three main alternatives: (1) Further transfers of agricultural manpower into industry and other urban employment; (2) increased use of female labor; and (3) expanded utilization of youth through earlier induction into active labor. As pointed out above, the first alternative has become subject to serious limitations; and while the second is being furthered through steps to expand preschool child-care facilities and boarding schools, it is apparent that the Soviet planners regard it as an insufficient contribution to a solution. This leaves the *expanded utilization of youth* as the only alternative capable of producing the immediately required additions to the industrial labor force, and it is precisely this solution which the educational reform program embodies in its provisions for lowering the terminal age of general schooling to 15, instead of 17 or 18 had the original policy of compulsory secondary education been adhered to. Beyond the age of 15, the reform places great reliance upon vocational preparation for employment and part-time schooling.

The discussion above was originally prepared in 1959, and to a large extent reflected the author's evaluation of the situation on the basis of scattered evidence from Soviet sources. In 1960, however, a Soviet source [96] estimated that during the Seven-Year Plan additional requirements for the number of workers and employees would be as follows:

Net increment planned in the number of workers and employees for 1959–65	12,000,000
Additional requirements to cover losses and withdrawals among employed persons	11,500,000
Gross requirement	23,500,000

[93] *Pravda*, Nov. 14, 1958.

[94] See especially *Vtoroi FYP*, pp. 338, 506. Workers and salaried employees numbered 22 million in 1932. The planned additional labor requirement for the period 1933–37 was 10.5 million, of which 3.4 million were for replacements and 7.1 million for new additions. Annual replacements, therefore, were to run about 680,000, or about 3.1 percent per annum.

[95] Appendix table VI–B–1.

[96] F. I. Kotov, *Voprosy truda v semiletnem plane* (Problems of Labor in the Seven-Year Plan), Moscow, 1960, pp. 112–113. Mr. Kotov is a labor specialist in the Economic Research Institute of the Gosplan.

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This gross requirement for the category of workers and salaried employees is to be satisfied from the following sources: [97]

1. Higher education graduates	2,000,000
2. Semiprofessional school graduates	3,000,000
3. Vocational-technical school graduates	5,000,000
4. Persons completing junior secondary (7- or 8-year) schools, senior secondary schools and schools with production training entering employment directly	5,500,000
5. Students in higher educational establishments, semiprofessional schools, vocational-technical schools, and secondary schools with production training who will be employed in industry and construction during the required periods of training or industrial practice (computed in the equivalent number of full-time workers and employees)	1,000,000
6. Adult collective farmers transferred from agricultural employment (except youths from rural areas entering employment as workers and employees upon completion of education)	3,000,000
7. Women entering employment from households of urban settlements	4,000,000
Total	23,500,000

If there were doubts as to the importance of the educational reform in speeding up additions to the number of workers and employees, these data would seem to dispel them. They indicate that 13,500,000 persons (items 2, 3, 4), or 58 percent of the gross requirements for workers and salaried employees, will consist of youths in the secondary-school age bracket.

It is also relevant that the 5 million persons completing vocational-technical schools (item 3) constitute more than a two-fold acceleration of the number trained during the 7-year period 1952–58,[98] which is indeed strong evidence of the reform measure to intensify vocational-technical training on the secondary school level. Furthermore, it is estimated that through the introduction of the work requirement for students enrolled in regular schools, the reform measures will add the equivalent of 1 million persons to the number of full-time workers and employees. Finally, in a number of passages, this source reiterates that the major source of the additions will come from youth, with only moderate additions supplied by the greater utilization of women and limited transfers of agricultural manpower.

Exactly to what extent accretions to the labor force will be augmented by the reform is extremely difficult to estimate in the absence of any clear indication of the contemplated level of enrollments in Soviet secondary schools, semiprofessional schools and higher educational establishments in the early 1960's.[99] It may be stated that upward of approximately 5 million youths who would otherwise be in various types of secondary schools in the early 1960's will be integrated into the labor force. This would represent the immediate accretions of new young labor resulting from implementation of the reform; however, the benefits of the revised educational structure as a permanent mechanism for assuring the early entry of youth into the labor force will enter more fully into play in the mid-1960's. As the numerical size of the age group from 15 to 17 years old begins to increase after 1963, increasing numbers of youths, instead of being able to continue full-time schooling, will, instead, continue to be channeled into employment after some vocational-technical preparation, and these accelerated additions to the active labor force will be fully realized in the middle and late 1960's.

2. *The School Reform and Labor Productivity*

The educational reform has further economic implications. The current Seven-Year Plan, which doubtless sets the pattern for future Soviet economic plans, is so designed as to make the fulfillment of stipulated production targets largely dependent upon advances in technology raising the *productivity of labor* more sharply than ever before. Thus, the current plan envisages the smallest expansion of the labor force of any Soviet economic plan on record, and on the other hand places the heaviest reliance to date upon gains in labor productivity through improved technology, organization, and man-

[97] From the categories of persons as listed who have completed various types of education, the number who will enter employment on collective farms has been subtracted in Kotov's figures.

[98] Text table III–1. During this period there were 2,214,000 vocational-technical school graduates trained for employment in the category of workers and salaried employees, i.e., excluding those trained for agriculture in order to make the figure comparable with Kotov's.

[99] It should be noted that the Soviet authorities mention anticipated figures for 1965 only, while figures most relevant to the reform for 1961–63 are not made public.

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agerial coordination.[1] While the effect of this increasing emphasis on qualitative rather than quantitative factors is difficult to measure in numerical terms, the trend itself is unmistakable. The point which should be kept in mind is that Soviet production targets in the past have usually been fulfilled by means of expanded employment (numbers employed as well as working hours) rather than by productivity gains (per worker employed, per man-hour). Now, however, with the manpower squeeze severely limiting the ability to expand employment, Soviet dependence on productivity gains has become very pronounced. The expressed intention of the educational reform is therefore not merely to permit accelerated additions to the labor force, but especially to provide training which will *effectively improve qualitative labor skills.* Such qualitative improvement is especially needed by the economy to complement the buildup of technical capital, and in this sense most of the changes introduced by the educational reform may be said to aim at a strengthening of the technological buildup by redressing the balance of the different kinds of manpower trained. The reform alters the rates, as well as qualitative preparation, at which the educational system turns out different skills in accordance with the demands of the economy.

In comparing quantitative Soviet labor requirements with those of the United States, it is frequently overlooked that labor productivity differs radically in the two countries. According to the Soviets' own estimates, the productivity of agricultural labor in the U.S.S.R. is about one-fifth that in the U.S.[2] Similarly, Soviet industrial labor is acknowledged to be only half as productive as American. These Soviet estimates, moreover, are optimal and substantially understate the actual labor productivity gap between the United States and the U.S.S.R.

Labor productivity is determined by many factors. Some of them are exogenous to labor, such as the state of general economic development, the availability of capital and its structure, technology, organization of production, etc.; others are indigenous to labor, such as the *learning curve of the labor force, the education and skill qualifications of individual workers, their motivations and incentives,* etc. While both sets of factors are influential, it is analytically impossible to measure their relative importance, or to determine the effect of each individual factor by itself.

It is beyond the scope of this study, moreover, to analyze the impact of education on Soviet labor productivity. There is no question that the Soviet Union has made significant advances in its educational system in recent decades, and that these advances have raised the general mental qualification level of Soviet workers. Nevertheless, it should be stressed that the educational level of the Soviet population and labor force in general still remains significantly lower, in terms of the median number of school years completed, than in the United States. Soviet reports covering various industries show that the median length of schooling among workers and salaried employees is 4 years or less. This figure applies to the industrial and urban work force; and if the Soviet agricultural labor force is considered, the median number of years of school completed will be even less. By comparison, the median number of years of schooling completed by the entire adult population (aged 15 and over) in the United States is about 11.[3] This suggests that the Soviet Union has in the past concentrated its educational drive on training the upper level (professional and semiprofessional component) of the labor force, rather than on the broad development of a higher skill level among the labor force at large. One major objective of the educational reform is apparently to remedy this imbalance

[1] According to Soviet official statistics, the proportion of total production increases attributable to increases in labor productivity was as follows for prior Five-Year Plan periods: first Five-Year Plan (1929–32), 51 percent; second Five-Year Plan (1933–37), 79 percent; the war years and fourth Five-Year Plan (1940–50), 69 percent; fifth Five-Year Plan (1951–55), 68 percent (*NKh–1956,* p. 35). Under the proposed sixth Five-Year Plan (1956–60), which was abandoned, the proportion was to have been 80 percent (*Pravda,* Feb. 25, 1956), and under the current Seven-Year Plan is to be 75 percent (*Pravda,* Jan. 28, 1959). It should be noted, however, that Soviet statistical methods of measuring output growth attributable to higher labor productivity are erroneous and biased (detailed discussion in H. S. Levine, "Small Problem in the Analysis of Growth," *The Review of Economics and Statistics,* vol. XLII, No. 2 [May 1960], 225–228), and substantially exaggerate the contribution of labor-productivity increases.

[2] U. S. Congress, Joint Economic Committee, *op. cit.,* p. 35. The original Soviet comparisons of U. S. and Soviet labor productivity appeared in *Sotsialisticheskii trud,* No. 4, April 1959. p. 19.

[3] N. DeWitt, "Basic Comparative Data on Soviet and American Education," *The Comparative Education Review,* vol. II, No. 1 (June 1958), 9–11. See also ch. VI in this study.

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by raising the level of educational and skill qualification of the intermediate and lower strata of the labor force.

Some Western observers have pointed to the Soviet program for a gradual reduction of the workweek (initiated in 1956 with a reduction from 48 to 46 hours[4]) as evidence refuting the thesis that the Soviet Union is suffering from a shortage of industrial manpower. The issue, however, is more complex. The reduction of working hours is but one of a number of measures taken in recent years to improve the treatment of workers, including increased pay and greater social security and retirement benefits. The primary purpose of all these measures is clearly to increase the man-hour productivity of labor by offering greater material and psychological incentives. It is undoubtedly true that the reform of the pension system and the increased maternity leaves could cause withdrawals from gainful employment. The introduction of a shorter workweek is, however, largely a labor-intensive measure. If American and British experience is taken as a guide, improved pay, increased benefits, and particularly a shorter workweek are highly effective means of stimulating gains in hourly productivity. Perhaps in the minds of Soviet planners the gains in man-hour productivity more than compensate for the number of hours by which the workweek is reduced. Furthermore, the decree initiating the reduction of working hours explicitly stipulated that hourly productivity rates *must* rise sufficiently to compensate fully for the reduction of working time, and a nationwide propaganda campaign was mounted to emphasize the necessity for higher hourly work norms.

3. *The Issue of Juvenile Labor*

The educational reform, by calling for the accelerated channeling of youth into the labor force, raises other problems connected with the employment of juvenile labor. The main features of Soviet legislation regulating employment conditions for youth may be summed up as follows.[5] Persons younger than 14 are legally precluded from any kind of gainful employment. For the next age bracket (14–16), employment regulations are more perplexing. Although present Soviet legislation provides as a general rule that only persons 16 years old or over can be hired for gainful employment, it authorizes the exceptional employment of 15-year-olds under special agreements between plant managements and the local government authorities and trade unions. Also, the wording of the regulations limits their application to "gainful employment," which is interpreted to mean a job performed on the same basis as when performed by an adult. Under this interpretation, the regulations do not as a rule apply to work as apprentices, so that such work can be performed by anyone who is at least 14. All apprentices (*ucheniki*), regardless of the type of training they are undergoing (whether the so-called individual and brigade [*individual'no-brigadnoe*] training in a given plant, or any of the apprenticeship programs of the State Labor Reserve), are considered to be outside the category of "gainful employment" even though they may work almost full time on the job.[6]

Again, the regulations stipulate that persons under 16 employed in industrial and urban jobs, whether as regular workers or as apprentices, shall not be required to "work" more than 4 hours per day. The term "work," however, does not include training activities. Similar rules apply to the employment of youths of 16 and 17, who may not be required to work in excess of 6 hours per day. Youths of 18 and above are considered adults and are employable without any further special restrictions. In addition to the conditions stated above, the legislative regulations stipulate the following requirements applicable to the employment of all youths under 18: no night-shift or overtime work; extended summertime vacations (1 full month), which cannot be forfeited for pay; and wage payments at the regular fullday rate paid to adult workers in equivalent jobs. There are also certain "health risk" jobs (listed for several hundred

[4] *Pravda*, Mar. 9, 1956. *SSSR—Tsif—1960*, p. 296, shows that at year end 1960 the average work day in Soviet industry had been reduced to 6.94 hours, as compared with 7.96 in 1956.

[5] Among many sources on this subject, see chiefly *Sbornik zakonodatel'nykh aktov o trude* (Collection of Legislative Acts Concerning Labor), Moscow, 1956, especially pp. 91, 119, 262–271; and *Direktivy—SBX—1957*, vol. IV, p. 626.

[6] Note that apprentices in the schools of the State Labor Reserve received on-the-job production training up to 41 hours per week. See further discussion in ch. III.

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specific occupational titles in various industrial branches) from which *all* youths are barred until age 18.

It should be noted that all these regulations apply only to industrial and urban employment; conditions of employment for juvenile labor in agriculture remain unregulated, and it is common practice for youngsters and teenagers to participate in agricultural work, especially in the seasonal periods of greatest activity.

One effect of these regulations for industrial employment has been to create reluctance on the part of managers to hire juvenile labor. A governmental decree of September 12, 1957, explicitly noted that the "heads of many industrial and construction enterprises, without valid reasons, refuse to hire and refuse to accept for job training boys and youths who are not yet 18 years of age but have completed secondary education and have the right of employment with a reduced work day." [7] This statement itself points to the very thing which is most responsible for the managers' reluctance to hire juveniles, namely, the fact that they work shorter hours for the same pay. Other reasons are indicated in the Soviet press.[8] For example, young people who take jobs often desire later to resume their education on a full-time basis and therefore withdraw from employment just when they have mastered the required skills. Also, males under 20 not enrolled in some kind of full-time schooling are subject to military draft, so that enterprises which hire and train them run the risk of losing them before getting full benefit from their services.

The educational reform measures are designed to solve these problems by introducing a more rational and coordinated system of training and employment of juvenile workers. To begin with, most youths aged 15 and over will receive some vocational skill training (either on-the-job training two days per week if they are in regular secondary school, or apprenticeship employment if they are enrolled in urban and rural vocational-technical schools). This training will acquaint them with employment routine. Industrial plant managements will be required to accept specified quotas of these youths for labor training, and the trainees will be paid out of the funds of the particular enterprise for actual work performed, according to the apprenticeship pay scale. This procedure will permit the *gradual* adjustment of youth to employment and at the same time will enable the management to select for regular employment trainees who have the particular aptitudes and skills needed by the enterprises. The training period will not count toward fulfillment of the trainees' employment obligation: upon completion of the training period, selected trainees will be required to accept regular employment in the enterprise for a period of two years. The majority of youths will not be permitted to proceed to higher education or to secondary semiprofessional schools unless they have fulfilled this 2-year full-time employment requirement. Thus, the educational reform has a built-in *labor retention* device. In addition, part-time schooling of the evening or extension-correspondence type, which will be expanded under the reform program, will help substantially to diminish the demand of working youths for separation from full-time employment.

It is clear from this summary of Soviet labor problems in relation to the educational reform program that this program is designed, first and foremost, to satisfy the trained manpower needs of the Soviet economy. If the U.S.S.R. is to surmount its quantitative manpower problems in the 1960's, it must make the fullest possible utilization of youth through earlier integration into the labor force. If it is to continue to grow economically and industrially at the pace desired by its leaders, it must rely more and more heavily upon improvements in technology and labor productivity. In the technological field, there has indeed been notable progress, but there must also be a commensurate advance in the technical skills of the labor force if a steady rise in productivity is to be achieved. This is the chief aim of the educational reforms.

Military Service and the Soviet Educational System

Power politics and international tensions are commonly translated by governments into re-

[7] *Direktivy–SBX–1957*, vol. IV, p. 718.

[8] See compilation of quotations in "Unemployment and Under-Employment in the Soviet Union," *Notes, Soviet Affairs*, No. 237, Feb. 23, 1960. (U. S. Department of State bulletin.)

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quirements for military service and training. These requirements, in turn, affect the pattern of utilization of existing manpower resources, and particularly the flow of new additions of trained and specialized manpower into the economy. They also have considerable impact upon the educational opportunities of many individuals, whose educational progress may be either terminated or considerably retarded by the performance of military service obligations.

The centralized bureaucratic structure of Soviet society is such that the various branches of economic activity, services and personnel can be mobilized for military purposes with relatively greater ease than in democratic societies. It might be said, in fact, that the normal state of Soviet society is one of constant partial mobilization. This must be borne in mind in discussing Soviet policies concerning military training and service as they affect students, scientists, and professionals.

1. *The Military Draft*

Although compulsory military service has been the law in the Soviet Union since the early days of the communist regime, Soviet draft laws have contained various selective provisions.[9] From about 1930 until 1939, all students in higher educational institutions and most students in secondary semiprofessional establishments, provided they were not over 28 years old, were deferred from the draft until they had completed their education, after which they were legally liable to be drafted for a one-year period of service. Actually, however, as Marshal K. Voroshilov, then Chief of the Armed Forces, pointed out in 1939,[10] a large proportion of the graduates of higher educational and secondary semiprofessional institutions went to work in various establishments and, through them, managed to obtain further deferments, sometimes until they reached the age of 30, when they automatically ceased to be liable to draft call. Although this situation was denounced as an injustice, it was primarily the exigencies of the international situation which caused a change in the draft law in September 1939.

The new 1939 law on universal military service,[11] which still remains in effect today, lowered the age of induction into military service, increased the length of service, and established new rules governing deferments. Length of service was set at 2 to 5 years. The age of induction varied, depending on the level of education of the draftees: all males with completed secondary education were to be drafted at 18, and those who had not yet completed their secondary education, at 19. Draft registration was required annually in January, and actual induction took place in September or October. The induction age, of 18 or 19, was specified as applying to the age reached by the inductee during the draft year.[12]

At the same time article 20 of the new law stated that "no one [except the physically unfit, of course] is excused from induction except persons deferred to complete their education."[13] Another article (29) of the same law stated that all students attending a 10-year school could be deferred up to age 20 for the completion of their education. Despite these provisions, the law was proclaimed a drastic change designed to restore justice and to create equality for all Soviet citizens subject to the military draft. It was believed that this law would put an end to the preferential treatment of students in Soviet higher educational establishments and that graduates of the Soviet 10-year school would be called into service the very year of their graduation.

The second provision of the universal military duty act, article 29 mentioned above, was aimed at secondary school students only. Overaged students in the upper grades of the Soviet 10-year school were deferred for a maximum of two years beyond the normal graduation age (18) in order to complete their secondary edu-

[9] The provisions of Soviet draft laws prior to 1930 are of historical importance only. Details may be found in H. J. Berman and M. Kerner, *Soviet Military Law and Administration*, Cambridge: Harvard University Press, 1955, *passim*.

[10] Verkhovnyi Sovet SSSR: Vneocherednaia Chetvertaia Sessiia (Supreme Soviet of the U.S.S.R.: Fourth Extraordinary Session), Aug. 28, 1938, *Stenograficheskii otchet* (Stenographic Recording of the Proceedings), Moscow, 1939, pp. 185–186; *Pravda*, Sept. 1, 1939.

[11] Verkhovnyi Sovet SSSR, *op. cit.*; *Pravda*, Sept. 3, 1939. A discussion of the various provisions of this law is given in Berman and Kerner, *op. cit.*, pp. 35–43.

[12] Consequently the actual age of inductees during the fall draft was between 18 and 19 (for persons with completed secondary education) or between 19 and 20 (for persons without completed secondary education).

[13] *Pravda*, Sept. 3, 1939. Summary in Gorokhoff, *Materials*, p. 16.

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cation, after which they would inevitably be drafted.

But the first provision of this law (art. 20) requires further attention. It does not single out secondary school students only. It simply states that excuses from induction are granted to those who have received deferments to complete their education, the level and type of which is unspecified.

In the 1930's the 10-year schools accepted children at the age of 8, but in many instances children who would not become 8 until some time during the academic year were also accepted. Thus the actual age of acceptance was 7 *or* 8, the latter being the common acceptance age among rural children.[14] At the same time, double promotions in the elementary grades were a common practice, and a child whose aptitudes permitted might be promoted from the first to the third or from the second to the fourth grade. Thus, even by 1939–41 there were children graduating from 10-year schools, not at age 18, but at 17 or even 16, the latter probably the brightest children (from urban areas primarily).

In 1944, however, the entrance age for pupils in Soviet 10-year schools was lowered from 8 to 7 years.[15] Again, the specified acceptance age 7 includes those who would become 7 during the academic year; i.e., they were still 6 when they entered the first grade. Consequently, the graduation age was also lowered from 18 to 17. In effect, this change assured that not only some, as formerly, but the majority of 10-year school graduates could enter higher education in the 1950's without being subject to military service immediately upon graduation from the 10-year school. Upon entering the higher educational establishment, the student received deferment from the draft.

Until 1954, Soviet higher educational establishments, according to law, accepted persons at age 17 to 35. The minimum age 17 was again interpreted loosely as referring either to those who already were 17 at the beginning of the school year or to those who would become 17 during the academic year, i.e., 16 when they entered. In 1955, however, in conformity with the lowering of the entrance age for pupils in the 10-year schools from 8 to 7, the minimum age requirement for acceptance into higher educational establishments was abolished.[16]

In 1940 the Committee on Higher Education issued a "clarification" that only those applicants who were already *registered* for the draft (*prizyvniki*) or who had had previous deferments (without further "clarification" of their draft status) were *not* to be accepted by higher educational establishments.[17] Thus even in 1940, it was possible for 16- and 17-year-olds, commonly called predraftees (*doprizyvniki*), with completed secondary education, to enter higher educational establishments upon meeting the other requirements, without being affected by the legal requirements of the universal military duty law. Once a student entered a higher educational establishment, he could be deferred until the completion of his education according to the provisions in article 20. In effect, therefore, the practice of deferments from one year to another continued with only one difference: the less fortunate or less able secondary school graduates were drafted immediately upon graduation,[18] while the rest could continue their education.

At the height of the war and at the turning point in the German invasion of Soviet territory a new law went into effect.[19] This law

[14] In addition, in rural schools it was also common practice to postpone acceptances entirely in one year, and have joint acceptances into the first grade of children in two age groups, 8 and 9, the next year.

[15] MP RSFSR, A. M. Danev (comp.), *Narodnoe obrazovanie—Osnovnye postanovleniia, prikazy i instruktsii* (Public Education—Major Decrees, Ordinances and Regulations), Moscow, 1948, p. 28. The decree of Sept. 8, 1943, stipulated that beginning with the academic year 1944–45 all elementary schools were to accept children at age 7. Actually, children of both ages (7 and 8) were accepted in the falls of 1944 and 1945, and only since the fall of 1946 have acceptances of the 7-year-old group become officially effective. Even in later years, however, especially in rural areas, pupils continued to be accepted at age 8.

[16] *Trud*, May 21, 1955. This provision apparently became necessary because it was about 10 years (i.e., 1944) since the entrance age for the 10-year school had been lowered.

[17] *Pravda*, June 25, 1940.

[18] According to a statement by Voroshilov in 1939, about 145,000 secondary school graduates were about to be drafted (*Pravda*, Sept. 1, 1939). This represented about 60 percent of the 10-year school graduating class for that year.

[19] Verkhovnyi Sovet SSSR, *Sobranie zakonov, postanovlenii i rasporiazhenii* (Collection of Laws, Decrees and Ordinances), No. 12, Sept. 15, 1943, p. 216 ff. This source lists all institutions in the fields of: aviation, military supply, armaments, shipbuilding, ferrous metals, nonferrous metals, coal, electric power, tanks, medium machine building, machine tools, heavy machine building, oil, chemicals, rubber, construction, railroads, river and sea transport, communications, and other polytechnical-industrial engineering institutes. About 85 establishments gave blanket draft exemptions.

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stipulated that all students in a list of some 85 higher educational establishments, primarily in the field of engineering, and also students in the two upper classes of all other higher educational establishments, as well as all students in the last year of secondary semiprofessional schools, were exempt (*osvobozhdaiutsa*) from the military draft.

Until 1955, this law was overlooked by Western observers, and it was commonly believed that everybody save the physically unfit were subject to military conscription in the Soviet Union. Berman and Kerner's volume on Soviet military law was the first Western study to call attention to the 1943 decree. The following interpretation regarding the military obligation of Soviet students was advanced by these authors:

> The 1939 law [i.e., the universal military service act] says nothing about exemption or deferment of students of higher educational institutions. A decree of the Council of Ministers of September 15, 1943, listed some 85 technical schools whose students were to be exempted from military service [i.e., the law just discussed]. The authors have found no other legislation on this subject. Apparently exemptions, and not mere deferments, are given rather generously to students who are engaged in pursuits considered vital for general military purposes, while other students are subject to conscription in their 18th year, if they have then completed secondary school, whether or not they are in a higher educational institution.[20]

Although Berman and Kerner recognized exemptions for upper-course students, this interpretation stressed an exemption policy benefiting only a limited number of higher education students. The situation was complicated further, however, by the fact that since students entered the 10-year school at the earlier age of 7 and therefore graduated at 17, the majority of 10-year school graduates were able to enter higher education immediately upon graduation without being subject to the draft, and upon entering higher education, they could receive deferments and exemptions.

Until 1955, therefore, the Soviet Union pursued a clear-cut policy of preferential treatment for higher education students with respect to the military draft. Successful secondary school graduates could enter higher education at age 17 unperturbed by the draft law. A number of articles in the Soviet press definitely confirmed that students in higher educational establishments were accepted in the fall, primarily from among graduates of secondary schools who had just graduated in the summer and, because of their age, were not yet subject to military draft. In other words, if one managed to enter and stay in a Soviet higher educational establishment, he was not likely to be inducted into military service.

The situation began to change in 1955, when preferential admission to higher education was introduced for those who had been employed in industry prior to applying for admission, as well as for veterans (see a detailed examination of admission policy changes in ch. IV). As in the past, those male youths who could still gain admission to higher education immediately upon graduation from secondary school continued to enjoy preferential treatment as far as the military draft was concerned. However, those who were not immediately admitted to higher education and entered employment instead automatically became subject to service induction a year or so later. Under the current educational reforms, the normal graduation age from full 11-year school will be 18. In addition, the provisions for preferential admission to higher education of those who have been gainfully employed or have served in the armed forces have been strengthened in recent years. Thus, it is likely that in the future a greater proportion of students entering higher educational establishments will be admitted only after completion of military service.

Since 1956 another problem has presented itself. While veterans with only secondary education could be admitted to higher education for the first year of study on a preferential basis, the question arose as to what to do about veterans who had obtained partial higher education by attending schools of the military establishment. In 1957 the Ministry of Higher Education issued special regulations stipulating that persons discharged from active military service who had already had partial higher education in schools of the military establishment would be admitted to civilian higher educational institutions without examinations, as students in ad-

[20] Berman and Kerner, *op. cit.*, p. 38.

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vanced standing.[21] Such persons are required to submit a course and grade transcript; and if the courses already taken in the military establishment are similar to those the student would normally take in his field of specialization in the civilian institution, he may begin with the second or third year of study.

It is important to note that although students in some semiprofessional schools were granted complete military draft exemptions, this rule was not general and applied only to upper-course students.[22] No such limitation existed in higher education. Furthermore, the regulations for semiprofessional schools include a special provision for the readmission of students whose studies were interrupted by military draft call: within 2 years after discharge from active military service, they may resume their education at the point where they stopped. Again, no such provision has been known to exist in higher education.

As far as the situation prior to 1958 is concerned, there is no evidence for doubting that all male higher education students in the Soviet Union were exempt from military service. In the postwar years, once a student entered higher education, he submitted an appropriate certificate to the local military (draft and mobilization) board (*voenkomat*), which first deferred and then exempted him from military service. However, all male students received reserve military training in the course of their higher education studies and, upon graduation, were integrated into the military reserve forces.

Although some of those who enjoyed preferential draft treatment may not have been the best students, the effect of Soviet military draft policies, on the whole, was to provide an additional element of selectivity both in secondary schools and in higher educational establishments. A student whose progress in secondary school was at least normal for his age had a good chance, because of the 1-year difference between secondary school graduation age and draft age, of entering higher education. This was not true in the case of repeaters or of pupils who started school later than age 7. In higher education, the draft policies supplied an additional stimulus to the maintenance of a satisfactory academic record, since failure led to expulsion and consequent loss of preferential draft status.

The present stage of development apparently offers new solutions for drafting young men into military service, although the situation is not very clear at the time of completing this study. The Soviet population deficit, which is keenly felt at present and will be particularly serious in the early 1960's, is exerting constricting pressure on the educational system, on new additions to the labor force, and on the recruitment and maintenance of large armed forces. The recent demobilization tactics of the Soviet Union are undoubtedly related to the population shortfall, which necessitates substantial cuts in the standing military force in order to meet civilian labor force requirements. The educational reform clearly fits into this context.

It is likely that students channeled into employment and (or subsequent) service in the military establishment of the U.S.S.R. will for the most part not begin higher education for at least five years after the completion of secondary school. Some exceptional students in certain fields of specialization (mathematics, science and selected engineering fields) will, as in the past, be able to bypass military service, but this flow in other fields will be considerably reduced. The educational reform will probably have the primary effect of facilitating the recruitment of new industrial labor, while at the same time it is likely to have the secondary effect of channeling youths into the armed forces prior to entry into higher education. Soviet sources are understandably reticent about discussing this latter subject. However, the problem was brought up briefly at a session of the Supreme Soviet of the Russian SFSR in April 1959, eliciting the following statement by the then Deputy Minister of Higher Education, Stoletov: [23]

> A number of deputies have raised the question as to how in the new system higher education and service in the armed forces can be reconciled . . . . This is an important problem which worries many parents . . . . The Ministry of Higher Education and the Ministry of Defense are working on proposals for the Council of Ministers which will resolve this problem more satisfactorily than in the

[21] *VyShko–SPR–1957*, p. 612.

[22] V. E. Zhirnov, *Voprosy planirovaniia kul'turnogo stroitel'stva SSSR* (Problems of Planning of Cultural Development in the U.S.S.R.), Moscow, 1958, p. 45.

[23] *Zasedaniia verkhovnogo soveta RSFSR*, p. 219.

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past. . . . The new system of higher education will be flexible to such an extent that it will create more favorable conditions for the education of youth who are called upon to bear arms in defense of the fatherland. . . . The problem will receive a satisfactory solution . . . .

Though the actual solution is uncertain, it is very likely, since the active military forces of the U.S.S.R. were cut in part, that reserve military training in all types of educational establishments will be intensified.

It is reported by visitors who had close contact with Soviet university life that male students as of 1959 and 1960 continued to receive officers' training needed for their commissioning upon graduation. The major problem, however, is that of youths in the draft age category, who, upon completion of secondary education, are required to take on full employment. Under the set-up promulgated by the reform, they all become subject to the military draft. Under these circumstances, the question may be raised whether the reform has not brought about automatically a virtual end of student deferments (except, of course, for those who enter higher education directly after graduation from secondary schools and are in selected fields of science and engineering).

2. *Coeducation and Military Training*

Prior to the Revolution, separate education for the sexes was the general rule in all Russian secondary and higher educational establishments, although in some elementary schools—particularly in rural areas—there was some coeducation. In accordance with the educational reforms after the Revolution, coeducation became universal in all types of schools (save military establishments) and remained so until 1943. In that year separate education was decreed.[24] Experiments along this line were begun in secondary schools in Moscow in 1942; and after further tryouts in other major cities and republic cities during the academic year 1943–44, separate education was introduced in 76 cities in 1944–45 and extended to 146 cities in 1945–46.[25] At the same time, coeducation in semiprofessional schools, higher education, and even in the majority of primary and secondary schools not located in these major urban centers continued. Furthermore, all extracurricular activities in urban schools remained coeducational. This mixed system lasted until 1954, when coeducation was restored in city schools and thus again became universal.

It is important to stress this because of the undue importance ascribed after the war to Soviet measures in 1945, which introduced segregation of the sexes in a limited number of schools. These measures were introduced under the stress of war conditions and the consequent necessity of intensive military training for boys. Syllabi, textbooks, and instruction methods all remained identical for both sexes. In some schools the sexes were separated in the intermediate and upper grades only. In other instances separate classes in the entire school (i.e., all grades 1–10) were held for each sex. In 1943–44 the Russian republic had about 1,600 schools of this type with 978,000 pupils, or about 7.2 percent, of the total enrollment.[26]

When limited separate education was abolished in 1954,[27] it was revealed that in the Russian republic some 2,300 schools out of a total of 41,200 were conducting separate instruction, and that by enrollment about 13 percent of all pupils were affected.[28] Except for this limited resort to separate education, which lasted about 10 years and affected a relatively small number of pupils, the principle of universal coeducation has remained in effect at all levels of the school system.

The sudden action taken to restore coeducation in 1954 calls for some comment. Soviet sources explained it in terms of a temporary expedient no longer necessary. They also indicated that boys' schools were noted for laxity of discipline, which in extreme instances had led teachers to refuse assignments to these schools.[29] Valid as these reasons may have been, there is yet another practical reason which should be considered. The declining enrollment in the upper grades created obvious complica-

[24] MP RSFSR, Danev, *op. cit.*, pp. 52–56.
[25] *Medynskii—1947*, p. 75.
[26] *NarObr RR—1944*, p. 9.
[27] *Pravda*, July 18, 1954.
[28] *Ibid.*, July 20, 1954 (article by Kairov, Minister of Education of the RSFSR). It should be noted that the figures on the number of schools refer to 10-year schools only.
[29] *Literaturnaia gazeta*, Aug. 6, 1953; and numerous references in *Uchitel'skaia gazeta* in April 1953.

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tions in regard to the utilization of both school facilities and teachers. Separate facilities for boys and girls in view of the declining enrollment led to smaller size classes, which had to be consolidated, thus leaving some schoolrooms idle as well as reducing the load upon individual teachers. The merging of even the limited number of schools conducting separate education undoubtedly helped to eliminate some of these complications.

In the 1920's more boys than girls attended Soviet primary and secondary schools. The male-female ratio was about 60 to 40. By 1938, however, this distribution had changed, and there were about 52 girls to 48 boys.[80] In 1950 it was claimed that "this relation was about the same and was in correspondence with the distribution of the population by sex." [81] Visitors to the U.S.S.R. in recent years invariably reported that considerably more girls than boys were attending the upper grades of Soviet secondary schools.[82] Soviet official statistics released in the late 1950's bear out this observation completely,[83] showing that the ratio in 1958 was about 55 girls to 45 boys. Such a sex distribution in the upper grades, creating difficulties in the full use of existing facilities and teachers, may have been an additional factor in the abolition of separate education.

It is to be noted that the current educational reform emphasizes coeducation as a general principle. An exception is made, however, for some boarding schools in the Central Asiatic regions, where separate boarding schools for girls of the local nationality are permitted in order to conform to the traditional social customs of the native Moslem population. Similarly, some normal schools for lower grade teachers will continue to function for native girls only. Military preparatory schools of the Suvorov and Nakhimov types are, of course, for boys only. In all other educational establishments, including most boarding schools, coeducation is to be continued.

The introduction of separate education was closely linked with military training for boys. Preservice training[84] in its present form emerged shortly before the war. In the 1930's, boys in the intermediate and upper grades used to receive 1 hour per week of military instruction, usually integrated with the physical education program. In 1939 military instruction became an independent subject in the Soviet school curriculum. During and after the war its purposes were more rigidly defined as an integral part of the preservice training program. In grades 5–7 at the present time, boys receive some military training in conjunction with physical education. In grades 8–10, however, it is a separate subject in which youths are required to learn the elements of military conduct, the use of light arms, mapreading, etc., along with the usual drill exercises. In addition to the curricular instruction, the *DOSAAF* (formerly *Osoviakhim*), a para-military organization, offers military training as an extracurricular activity.

In higher education and in secondary semiprofessional schools (excluding military schools), coeducation has always been the rule. In these establishments, military training for males of draft eligibility age, but who were deferred or exempted from active service, was always a supplemental but obligatory requirement. In fact, there are in existence specific programs for military training which require a total of 360 to 450 instruction hours.[85]

According to a 1959 account by a Soviet exchange student, military training in higher educational establishments of the U.S.S.R. is obligatory for all male students who have not had prior active military service. Two to 4 hours of training per week are required in the first 4 years of study.[86] This instruction, called *spetskursy* (special courses) is not included in the regular curriculum. It is supplemental activity and is not listed in the regular programs of study for higher education. Military courses include military drill and rifle instruction, as well as specialized military subjects—command, tactics, technical aspects of weapon maintenance, etc. At the end of the fourth year, male higher education students are required to take a special

[80] *Medynskii—1952*, p. 83.
[81] *Idem.*
[82] See *SPM*, p. 57.
[83] See section on male-female enrollment trends in secondary schools in ch. II.
[84] For further details, see Berman and Kerner, *op. cit.*, and discussion above.
[85] *VyShkoSPR—1945*, pp. 122–132.
[86] The range in hours for obligatory military training would thus be from 288 to 576.

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qualifying examination before a board of military examiners, and those who pass are commissioned as officers, usually junior lieutenant or lieutenant in the first-call reserves. Grades received in military courses are also taken into account in awarding commissions. However, if the grade received in the qualifying examination is not high enough,[37] the person is appointed to noncommissioned rank, usually sergeant, and is also assigned to first-call reserves. In either case, available information suggests that the graduate is *not* called to active military service upon the completion of higher education.

Before World War II, employed graduates of higher educational establishments were granted either exemption from military service or continuing deferments which amounted to exemption. During the war mobilization, many branches of the Soviet economy were militarized; and specialists, particularly in engineering and technical-managerial positions, were often left in their jobs, although some were assigned commissioned officer's rank. From the end of the war up until the late 1950's, there seems to have been a return to the prewar practice. The granting of straight exemptions from military service, or deferments amounting, in effect, to exemptions, to students in higher education constituted an integral part of Soviet policies for giving preferential treatment to trained professionals whose efforts were essential to the industrial and scientific buildup of the national power potential.

Informal Education for the Masses: The People's Universities of Culture

One of the most novel developments in Soviet education, more or less coinciding in point of time with the reform program, has been recent emergence and rapid expansion of informal types of adult education accessible to the general public. This development has found particularly striking expression in the growing network of so-called "People's Universities of Culture" (*narodnye universitety kul'tury*), sometimes referred to in the Soviet press by the abbreviated initials *U.K.*

Except for on-the-job training courses designed to develop specific vocational or technical skills and for coaching instruction in the performing arts provided by amateur groups at trade union clubs, the U.S.S.R. until 1958 did not have any program of informal education. A Soviet citizen who wanted to learn how to drive a car or to study dress-designing had to enroll for formal instruction in a school on the vocational or semiprofessional level. However, as a result of popular demand for greater informal education facilities (i.e., courses not leading to "certification" or aimed at imparting specific job-oriented skills), a new program was launched in the Ukrainian SSR in the spring of 1958. Adult education centers offering informal training in various skills were set up in a dozen major cities under the name of People's Universities of Culture.[38] This novel educational experiment evoked wide interest and quickly spread to many other major cities in various parts of the U.S.S.R.[39] By the middle of 1959, the number of these "universities" had mushroomed to 1,000,[40] and at the end of 1959 there were 1,600 such centers in the Russian SFSR,[41] 1,200 of them in cities and 400 in rural communities.

To a great extent, the programs provided by the Universities of Culture appear to resemble American extension courses, although the Soviet programs particularly emphasize skill subjects (sewing, decorative art) as well as literature, music, art appreciation, and popular science. The new establishments also offer courses in dancing and automobile driving. Most courses are given in the evening, using either club lecture halls or the facilities of regular educational establishments. The length of the courses ranges from 2 months to 2 years.[42] At present there do not seem to be any rigorous curricular or other requirements.[43] The pro-

[37] The examination is conducted orally in several subjects, and an average grade of at least 4 (i.e., "good") appears to be required for the commissioned officer's rank.

[38] E.g., see account in *Rabochaia gazeta* (Ukraine), Apr. 9, 1959.

[39] *Pravda*, May 4, 1959.

[40] *Ibid.*, July 9, 1959.

[41] *Sovetskaia Rossiia*, Dec. 3, 1959.

[42] *Kommunist* (Armenia), Jan. 10, 1960.

[43] Several of these centers are described in the English-language Soviet propaganda journal, *U.S.S.R.*, No. 12 (39), December 1959, pp. 32–39.

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grams are just beginning to develop and promise to expand substantially, since they offer the many persons who cannot pursue formal education the opportunity to satisfy their thirst for learning, without "obligation," so to speak. They represent a departure from the narrow functionalism which has dominated Soviet education for the last few decades, and their continuing development will no doubt help to provide cultural recreation and spare-time skill training on a large scale.

Various other educational facilities along the lines of the Universities of Culture have come into existence. These include the People's Institute of New Technology in Baku; the University of Arts and Esthetics in Gomel' and Erivan; the University of Agricultural Technique in the Voronezh region; the Workers' University in Kokhla Iarve (Estonia).[44] All these education centers offer popular lecture courses and classes in painting, as well as instruction in industrial technique and economics.[45] There also are a number of so-called "institutes for innovators" (*instituty novatorov*), which engage primarily in disseminating a popular brand of technological education.

Besides offering lecture programs and course instruction, the Universities of Culture also organize "brigades of communist toilers" [46] with the objective of promoting higher labor productivity and encouraging the introduction of new techniques in industry and agriculture. Thus they are designed not merely to play an educational role, but also to function as a propaganda medium for urging the Soviet people to put forth greater effort in production.

Although such informal programs are not on a par with higher or even secondary vocational education, many higher educational establishments play a part in organizing these activities and providing lecturers and instructors from their academic staffs. Furthermore, some higher educational establishments have established, on their own premises, divisions of culture (*fakul'tety kul'tury*) where students may take courses in art appreciation, literature, drama and other types of esthetic education.[47] This is an innovation in the field of Soviet higher education. Interestingly enough, a Soviet electronics engineer who spent the 1958–59 academic year in the United States as an exchange student entered on one occasion into a heated argument with three of his colleagues from Moscow, also engineers, on the question of giving Soviet technicians "cultural" as well as technical training. While his colleagues argued that "cultural" education (art, music, literature, etc.) should be a private, spare-time affair, and that the demands of specialized education left no room for cultural study, the young engineer, who hailed from Siberia, insisted that such study should be required even of engineering students, who could then "bring back from culturally rich Moscow a bit of artistic joy" to their home provinces. To Western ears such pleas sound strange. Perhaps the People's Universities of Culture and extracurricular courses in various artistic and humanistic subjects, beyond their propaganda value, will indeed begin to fill an empty spot in the Soviet educational effort. In part at least, they represent an attempt to provide education aimed at developing esthetic appreciation rather than simply inculcating some productive work skill.

Financing and Monetary Aids in Soviet Education

Perhaps one of the most neglected aspects of the Soviet educational effort is that of the state's role in the overall financing of teaching and research activity and in providing financial support to individual students through a system of scholarship subsidies commonly called "stipends" (*stipendii*). This section will endeavor to bring into focus the major features of financing and monetary aid in Soviet education, without attempting, however, to go into an exhaustive discussion of this involved subject.

It should be pointed out first that most of the problems of financing education as they emerge in free market economies are not applicable in the Soviet case. In the U.S.S.R. there

[44] *Izvestia*, Jan. 13, 1960; *Sovetskaia Belorussia*, Dec. 1, 1959; *Kommunist* (Armenia), Dec. 15, 1959, Jan. 10, 1960; *Sovetskaia Estonia*, Apr. 1, 1959.

[45] *Sovetskaia Rossiia*, Jan. 6, 1960. In addition, there are reported to be 3,500 newly-established "Schools of Economic Fundamentals," with 100,000 course participants.

[46] *Pravda*, May 4, 1959.

[47] *VVSh*, No. 5, May 1959, pp. 44–45.

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are no private educational establishments, no private sources of financial support, no endowments, no revenue-creating investment funds, no support through local or state taxes. Most of the funds for education in the Soviet Union originate from a single national budget, which derives its revenue from a nationwide system of taxation. The two major components of revenue for the national budget are the sales tax (the so-called "turnover tax") and the enterprise profit tax. In 1959 the total budget revenue was reported to be 740 billion rubles, of which 311 billion rubles, or 42 percent, were derived from sales taxes, and 160 billion rubles, or 21.6 percent, from taxes on enterprise profits.[48] The remaining 269 billion rubles, or 36.4 percent, were collected by various other means—direct taxes on the population, duty taxes, sales of Government bonds, social security levies, agricultural taxes, etc. The national revenue thus collected is allocated for different uses—financing of investments of the national economy, social security payments, defense, Government expenditures, public health measures, and—among these others—education. The funds allocated for education are disbursed through various administrations managing the different networks of the educational system.

1. *The National Budget and Expenditures on Education*

Article 121 of the Soviet Constitution, as amended in 1958, declares that the citizen's "right to education" is assured "by free education in all schools" and by "a system of state stipend grants" to students for the purpose of helping to support them while they are in school. The Soviet Government subsidizes most (but not all) educational activities through the national budget. Although the communist ideology views all public services, including education, as economically "nonproductive" areas of activity, Marx postulated over a century ago that once the socialist state had been established, the share of "social product" devoted to the satisfaction of common social needs (such as public education, public health, and social services of all types) would "immediately increase in comparison with its share in the present [capitalist] society and would continually increase as the new [communist] society develops."[49] Starting out from this ideological premise, Soviet party theoreticians coined an alleged social law (*zakonomernost'*) according to which an "ever-growing share" of the national budget in a socialist state is supposedly devoted to expenditures on education and other social services. A look at table I–2, however, readily reveals that this supposed "law" has not held true with respect to educational-cultural expenditures in the Soviet Union. The table summarizes the official Soviet budget figures for such expenditures in various years between 1933 and 1959 (and the planned expenditures for 1960), giving a breakdown of these outlays by type of educational institution or cultural activity, and showing the percentage shares of education-culture and of education "proper" in total budget expenditures.

As the table indicates, not all educational-cultural expenditures itemized in the Soviet budget are for education proper, i.e., for the operation of educational institutions and the payment of stipends. In addition to the allocations for the various types of schools (rows 3 and 4), educational-cultural expenditures also include outlays for research and development (row 5*b*), for public libraries, museums, exhibits and the like (row 5*a*), for publishing (row 5*c*), and for entertainment and broadcasting (row 5*d*). On the other hand, it is important to note that the budget figures do not include expenditures by Soviet enterprises for educational-cultural purposes, financed from their own funds. A large share of these latter outlays goes into research, technological development, and on-the-job training programs. In 1957, such supplementary expenditures outside the national budget augmented the total sum spent for educational-cultural activities by 15 percent of the budgetary appropriation.

The data in table I–2 indicate a trend over the years of raising the outlays of current rubles for education. In 1933 the Soviet Union spent 4.9 billion rubles on all educational-cultural services, of which 4.1 billion rubles were for education proper. In 1959 all educational-cul-

[48] *NarKhoz—1960*, p. 800.

[49] K. Marx and F. Engels, *Sochineniia* (Collected Works), Moscow, 1952, vol. XV, p. 273.

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TABLE I–2.—*Expenditures on educational-cultural services in the U.S.S.R.'S national budget for selected years*

[In billion current rubles]

Types of expenditures	Actual expenditures										Planned 1960
	1933	1937	1940	1950	1953	1955	1956	1957	1958	1959	
1. U.S.S.R. national budget, total annual expenditures	42.1	106.2	174.3	413.2	514.7	539.5	563.5	607.3	642.7	704.0	745.8
2. Expenditures on educational and cultural services from national budget, total	4.9	16.5	22.5	56.9	61.1	68.9	73.6	80.7	86.0	94.1	102.2
(2) in percent of (1)	11.6	15.5	12.9	13.8	11.9	12.8	13.1	13.3	13.4	13.3	13.8
3. General education, total	2.0	8.3	11.9	30.4	32.2	33.5	34.5	37.6	39.8	44.3	.....
a. Nursery schools	.1	.6	2.9	3.3	3.0	3.6	4.0	4.7	5.2	6.0	.....
b. Children's homes and homes for physically handicapped	.2	1.2		4.9	3.3	2.9	2.7	2.9	3.1	3.2	.....
c. Elementary, 7-year and 10-year schools	1.7	6.5	8.9	20.1	23.3	24.2	24.2	25.7	26.6	30.0	.....
4. Specialized training, total	2.1	5.6	7.7	18.3	19.3	23.3	24.2	24.2	23.5	23.9	.....
a. Higher education	1.1	2.3	2.9	7.2	8.9	10.2	10.7	11.1	11.4	11.5	.....
b. Secondary specialized education	.6	1.2	1.8	4.4	5.0	5.9	6.2	5.8	5.4	5.2	.....
c. Trade and railroad schools				2.8	2.0	1.7	1.5	1.4	1.9	2.2	.....
d. FZO-type schools	.4	2.1	3.0	1.3	.9	.9	1.1	1.1	.7	.3	.....
e. Vocational-technical schools				n	n	.4	.6	.7	.7	.7	.....
f. FZU-type schools				1.4	1.5	3.1	3.0	2.8	2.3	2.8	.....
Education proper: total (3), (4)	4.1	13.9	19.6	48.7	51.5	56.8	58.7	61.8	63.3	68.2	.....
(3), (4) in percent of (1)	9.7	13.1	11.2	11.8	10.0	10.5	10.4	10.2	9.7	9.7	.....
5. Other services, total	.8	2.6	2.9	8.2	9.6	12.1	14.5	18.4	22.3	25.4	.....
a. Cultural services	.3	1.1	.8	1.7	2.1	2.5	2.6	3.1	3.1	3.3	.....
b. Research (national budget only)	.3	.9	1.1	5.4	6.3	8.3	10.3	13.6	17.0	20.0	.....
c. Publishing	.1	.2	.4	.5	.5	.6	.7	.7	.9	.9	.....
d. Entertainment and broadcasting	.1	.4	.6	.6	.7	.7	.9	1.0	1.3	1.2	.....
6. Unexplained residual[a]	.....	.....	1.0	.....	.....	.....	.4	.5	.4	.5	.....
Expenditures on educational-cultural services from all sources[b]	6.9	20.6	n.a.	64.7	71.2	80.6	87.0	93.7	n.a.	n.a.	.....

[a] Difference: Row (2) minus the sum of rows (3) and (4). Note also that the subitems do not always exhaust the totals, probably because of rounding.

[b] The additional financing comes primarily from the state, cooperative enterprises, and social organizations and collective farms. In 1957 these other sources contributed 12.8 billion rubles.

n. a.—not available.

Sources: *SotsStroi—1933–38*, p. 111; *Kul't Stroi–1940*, pp. 33, 115; K. N. Plotnikov, *Biudzhet sotsialisticheskogo gosudarstva* (Budget of the Socialist State), Moscow, 1948, pp. 138, 146; *KS–1956*, p. 73; *NarKhoz–1959*, pp. 900, 903–905; *NarKhoz–1960*, p. 803; Ministerstvo Finansov SSSR, *Raskhody*, pp. 5, 10; *Izvestia*, Dec. 23, 1958; *Pravda*, Oct. 28, 1959.

tural outlays amounted to 94.1 billion rubles, of which education proper received 68.2 billion rubles from the national budget. This 17-fold increase in expenditures for education proper was substantially smaller (about 7 times), however, when measured in constant (1955) rubles, so as to take into account the inflation which took place during this period.

Considering only the outlays included in the budget, it is clear from the table (row 2) that the proportion of total annual expenditures accounted for by educational-cultural (*prosveshchenie*) allocations as a whole fluctuated through the years. In 1933 the figure was 11.6 percent. The alltime high came in 1937, when the proportion was 15.5 percent. In the postwar years it has ranged from a low of 11.9 percent (1953) to a high of 13.8 percent (1950).[50] The planned expenditures for educational-cultural services in the 1960 fiscal year indicate a proportion of 13.8 percent also.

The table further shows that, while the allocations for education proper have increased in absolute terms with the growth of the overall budget, they have actually accounted for a declining proportion of total budget expenditures. The highest proportion, 13.1 percent, was reached in 1937, after which there was a gradual decline to 9.7 percent in 1959. The share of education proper (sum of rows 3 and 4) in the total budget allocations for educational-cultural services (row 2) has likewise shown a steady downward trend over the period since 1940,

[50] Ministerstvo Finansov SSSR, *Raskhody*, p. 5.

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dropping from 87 percent in that year to 72 percent in 1959.

2. *Educational Expenditures in Relationship to Gross National Product*

The place of educational expenditures in the national budget is not to be confused, of course, with their relationship to gross national product (GNP), or national income. To estimate a country's total national income is an extremely complicated statistical operation.[51] If, however, we accept estimates placing the gross national product of the U.S.S.R. in 1955 at approximately 1,000 billion adjusted rubles,[52] then the educational expenditures proper provided for in the national budget (excluding supplementary outlays not borne by the budget) amounted to about 5.8 percent of the GNP. In relationship to the Soviet GNP in current (unadjusted) rubles, which amounted to 1,202 billion rubles in 1955,[53] the budgetary outlays for education in that year constituted 4.7 percent of the GNP. As already stated, the budgetary allocation of funds for education is necessarily lower than the total amount spent on education in the Soviet Union. It does not include additional funds from other sources, such as contributions from collective farms, trade unions, and funds of industrial enterprises, or payments collected from individuals as fees for nursery schools, boarding schools, tuition fees (during the 1940–55 period), and personal contributions from parents toward students' room and board. If these additional sources of funds are added, the total educational expenditures would be substantially higher than indicated by the national budget. This study cannot attempt a refined assessment of the amount collected from these additional sources, but will merely state here that all indications are that at the present time the U.S.S.R. spends substantially more than 5 percent of its GNP on education.[54]

3. *Disbursement of Funds for Education*

The process of determining the allocation of funds for education in the Soviet national budget is carried out according to a variety of normative rules and regulations. There are norms for student/teacher ratios, for expenditure per student, for operating cost per unit of a given size of educational establishment, etc. All these norms are worked out and legislated *ad hoc* by the State Planning Committee and the Ministry of Finance. They are contained in various manuals, which serve the local educational authorities and individual educational units as a basis for preparing their annual budgets. On the basis of the prescribed norms, each individual educational establishment drafts its budget for a given calendar year. The individual budgets are then consolidated at the local, regional, republic, and finally the national level by the appropriate organs of educational administration, which also add capital outlays for projected new construction and capital repairs. All these budgets are submitted for approval to the Ministry of Finance of the U.S.S.R., which integrates them into the national budget allocations for education. In this fashion, the educational expenditures fixed in the national budget represent the aggregate total to be spent on salaries, maintenance, operation, capital construction, equipment, etc., by all state-operated educational establishments in the country.

Once a year the Supreme Soviet convenes for the purpose of "ratifying" the national budget. Actually, it does little more than "rubber-stamp" the budget as drawn by the Ministry of Finance, after which the budget becomes "law." It is obvious from all this that local desires and preferences with regard to educational facilities can be met only to the extent that norms of educational expenditure fixed by the central authorities permit it.

All national budget expenditures are subdivided into two components: the all-union

[51] See A. Bergson, *Soviet National Income and Product in 1937*, New York: Columbia University Press, 1953; and O. Hoeffding and N. Nimitz, *Soviet National Income and Product, 1949–1955*, ASTIA Doc. No. AD 213477, RM-2101, Santa Monica: The Rand Corp., April 6, 1959.

[52] This is an estimate made by Professor A. Bergson of the Soviet GNP in adjusted rubles, i.e., net of turnover tax. A more refined figure will appear in his forthcoming study on the real national income in the U.S.S.R.

[53] Hoeffding and Nimitz, *op. cit.*, pp. 8–9.

[54] One Western estimate places this figure as high as 8 percent. See U.S. Department of State, "U.S. versus Soviet Spending for Major GNP Categories," *Intelligence Information Brief*, No. 87, Feb. 24, 1959, p. 3 (unclassified).

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budget (*soiuznyi biudzhet*) and the republic budgets (*biudzhety soiuznykh respublik*). In recent years the total expenditures have been about evenly divided between the two components. Educational-cultural expenditures over the last two decades have tended to account for an increasing share of the all-union budget, rising from about 25 percent in 1940 to about 36 percent in 1957. Expenditures for primary and secondary schools are concentrated mainly in the republic budgets, while outlays for higher education and specialized training (and also research) are concentrated in the all-union budget.

4. *Financial Support of Preschool Education*

Perhaps the most controversial topic having to do with Soviet nursery schools is the tuition charged to the parents of enrolled children. Under a decree promulgated in the mid-1930's, and still in effect, parents are required to contribute 25 to 35 percent, depending upon their income, of the actual cost of maintaining a child in nursery school.[55] Soviet sources give no indication, however, of the specific amounts of such contributions. Certainly, the cost per child varies significantly from school to school, particularly as between urban and rural nursery schools, because of differences in facilities, staff, and equipment. Furthermore, discounts ranging from 25 to 50 percent of the computed fees are available to parents, depending upon marital status, income, and number of children.[56] Widows of war veterans are particularly favored. On the basis of known norms of expenditures for food, allowances for toys and study materials, and normal staffs and staff salaries in Soviet nursery schools, the annual cost per child (based on 290 attendance days annually) can be estimated at somewhere between 2,500 rubles and 3,500 rubles (as of 1955), of which parents may contribute between 400 and 1,200 rubles annually. These rough estimates may be checked by working from officially published Soviet budget figures showing outlays for nursery schools and total parental contributions.[57] By using these data in conjunction with nursery school enrollment figures,[58] it can be calculated that parents contributed an average sum of 555 rubles toward the per-child cost of 3,100 rubles in 1951, and 685 rubles out of the cost of 2,900 rubles in 1957. These figures suggest an average annual contribution amounting to a little less than 10 percent of the average annual wage of Soviet workers and employees.[59] This would hardly seem to support the contention of some Western observers that the charges made for nursery schooling are so high as to cause economic hardship. The fees are, in fact, of secondary importance compared to the limited availability of nursery school facilities, especially in rural areas (see ch. II for a more detailed discussion).

5. *Tuition Fees*

The abolition of tuition fees for secondary and higher education in the Soviet Union was decreed by the Council of Ministers in 1956.[60] As was indicated in the author's earlier study on the basis of information from private sources, tuition fees were actually discontinued in the U.S.S.R. sometime in 1954, although their abolition was not decreed officially until the summer of 1956.[61] The fees had originally been introduced in 1940 and were required of students in the upper grades of secondary schools, as well as in higher educational and secondary

[55] MP RSFSR, Danev, *op. cit.*, p. 266.

[56] L. Potekhin *et al.*, *Planirovanie raskhodov na soderzhanie uchrezhdenii prosveshcheniia i zdravookhraneniia* (Plans for Expenditures for Maintenance of Educational and Public Health Establishments), Moscow, 1955, p. 65.

[57] Ministerstvo Finansov SSSR, *Raskhody*, p. 49. Figures rounded in million rubles:

Financing of nursery schools from—	1951	1952	1953	1954	1955	1956	1957
National budget.....	3,179	3,111	3,040	3,167	3,610	3,980	4,657
Parents' contribution.....	697	827	928	1,041	1,091	1,229	1,436
Total.....	3,876	3,938	3,968	4,208	4,701	5,209	6,093

These expenditure figures refer to full-time nursery schools only. Another 44 million rubles (less than 1 percent of the total) were spent in 1957 for seasonal nursery schools.

[58] See text table II–2 and appendix table II–A–O.

[59] Estimates of the average wage of Soviet workers and employees vary considerably, ranging between 6,000 and 10,000 rubles per annum for the mid-1950's. The average wage in 1955 was probably in the neighborhood of 8,500 rubles, according to the most reliable estimates (A. Bergson, unpublished estimates as of March 1959; see also data in Hoeffding and Nimitz, *op. cit.*, pp. 62–68).

[60] Malin, *op. cit.*, p. 261. This book, incidentally, contains a handy compilation of Soviet Government and Communist Party decrees issued during 1956–57.

[61] *SPM*, p. 51.

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specialized establishments. Prior to 1940, higher education, as well as other forms of education except nursery schools had been tuition-free. The significance of their introduction and their impact during the period 1940-56 have been the subject of much controversial discussion among Western sociologists specializing in the Soviet field.

One commonly held view has been that the introduction of tuition fees was primarily associated with the emergence of a pattern of economic inequality in the Soviet Union. The proponents of this view argued that whatever the reason given by the Soviet Government for its action (i.e., that the public, because of the improved level of general welfare, ought to bear part of the cost of education directly), the impact of the fees was discriminatory since they served, in effect, to increase economic differentiation. Admittedly, the establishment of tuition fees imposed some hardship on parents in the low-income groups (peasants and unskilled labor), although it should be noted that in special cases involving able students who were orphaned or whose families could not afford to pay for their education, tuition fees were often paid by welfare agencies, the local soviets or the trade unions. However, at the time the fees were instituted in 1940, they were fixed at 150–200 rubles per year for students in grades 8–10 of secondary school,[62] which represented only 4 to 5 percent of the average annual earnings of Soviet workers and employees.[63] Moreover, while Soviet wages have risen considerably since 1940, the tuition fees remained fixed and thus represented a decreasing proportion of the average annual income of Soviet wage earners.

In higher educational institutions and secondary specialized schools, tuition fees during the period 1940-56 ranged from 300 to 500 rubles per academic year.[64] Here, however, the fees were largely offset by the grant of monthly stipends to most successful students by the individual higher educational establishments or semiprofessional schools. The amount of the stipends was such that 1 to 3 months' payments covered the student's tuition fees. Moreover, as indicated above, the fees themselves in such schools were quite nominal, equaling about 1 month's average salary for Soviet workers and employees in 1940, and only about half a month's average wage in the early 1950's. The 1940 decree further stipulated that needy students, even if they received stipends, were exempted from paying tuition fees, and the same exemption was extended to veterans, war invalids, students with one or both parents in the armed forces, orphans, students with only one living parent, and other hardship cases. There were also some 50 institutes (mostly pedagogical) which granted blanket exemptions from tuition to all students of national minority groups.

Consequently, while the tuition fees may have caused hardship in some cases of students from low-income families, they do not appear to have been deliberately discriminatory in purpose, or in their general effect. On the other hand, the Soviet explanation that the fees were instituted simply as a revenue measure is not very convincing either. In the early 1950's the maximum revenue from this source cannot have exceeded 1 billion rubles annually, or less than 10 percent of total Government expenditures on higher and secondary specialized education. It seems most probable, therefore, that the fees were largely intended to ensure that students seeking admission to higher and secondary specialized educational institutions, as well as their parents, would be serious in their motivations. It seems probable also that the dual system of fees and stipends, with the latter subject to withdrawal if the student failed to maintain satisfactory grades, was designed to promote higher standards of academic selectivity. In the latter purpose, however, the system not only proved ineffective (see discussion in ch. IV), but actually tended to undermine grading standards because of the reluctance of the educational establishments to penalize students by withdrawal of their stipends and thus subject their families to financial hardship.[65]

In sum, the tuition fees were not sufficiently high to be justifiable as a revenue measure, nor

[62] *VyShkoSPR—1948*, p. 547.

[63] Annual average earnings in 1940 were about 4,000 rubles. For further data on Soviet wages, see M. Yanowitch, "Changes in the Soviet Money Wage Level since 1940," *The American Slavic and East European Review*, vol. XIV, No. 2 (April 1955). 219.

[64] *VyShkoSPR—1948*, p. 547.

[65] *Literaturnaia gazeta*, July 1, 1954, pointed to the anxiety of students without family financial support, who faced the constant threat of losing their stipends if they failed their examinations even in a single subject.

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was the combination of fees and stipends effective in raising academic standards. At the same time, the fees were a definite liability so far as communist propaganda was concerned. The final result was that they were dropped in 1956 as part of the Soviet trend toward renewed emphasis on egalitarianism.

6. *Stipends*

Just as in the matter of tuition fees, Soviet policy regarding financial aid to students has passed through three stages: pre-1940, 1940–56, and post-1956. During the pre-1940 period, free education was linked with the principle of universal scholarship aid. Theoretically, every student was entitled to a monthly stipend, and actually about 90 percent of all students received such aid.[66] Stipend funds were allocated to higher educational establishments by the various economic commissariats, but these allocations were generally insufficient to permit the payment of stipends to all students. Also, stipends were not payable to students on probation (i.e., those who received up to three nonpassing grades in any one term).

With the introduction of tuition fees in 1940, the stipend program was also altered substantially. From 1940 to 1943, only honor students (i.e., all grades either excellent or good) were eligible for stipends. Then, in 1943, a provision was introduced whereby students in 85 engineering institutes and in Moscow and Leningrad State Universities, provided they had all excellent grades, were granted bonuses amounting to 25 percent of the base stipend.[67] The amount of the base stipend in these schools ranged from 210 to 315 rubles per month, depending upon the year of study. Bonuses were also instituted in a second group of higher educational establishments[68] whose base stipends, however, were considerably lower, ranging from 140 to 210 rubles per month. Finally, some higher educational establishments continued to grant stipends to honor students only. These differences prevailed until 1956 and reflected the current priorities for the training of specialists in the engineering-technical fields.

There were further changes in the system of stipends with the 1956 return to free education. These, however, did not affect the size of the stipends, which remained as follows for the two groups of Soviet higher educational establishments:[69]

Year of study	Amount of monthly stipend	
	Group I	Group II
1st year	210	140
2d year	240	160
3d year	275	185
4th year	275	185
5th or 6th year	315	210

Group I includes the major engineering schools and several universities: group II, other higher educational institutions. Bonuses of 25 percent for students receiving all excellent grades were also retained.

The major changes of 1956 had to do rather with the procedures for awarding stipends. It is to be noted particularly that these changes, authorized by the Ministry of Higher Education, had the prior approval of the All-Union Council of Trade Unions (*VTsSPS*). Under the revised system, stipends are awarded by individual committees for each higher educational institution, the committees being composed not only of academic and administrative personnel of the particular institution as in the past, but also of representatives of "social organizations," namely the Communist Party, the Komsomol, and the trade unions. Grants are made "on the basis of the academic record and material need of students."[70]

Stipend award regulations do not explicitly define the criteria of "material need," but private information indicates that students whose parents have a joint income in excess of 2,000 rubles per month are not eligible for stipends. The academic criteria are stated as follows:[71] Students with grades all excellent or good are universally eligible; students with "passing" grades who meet certain other criteria are also

[66] *SotsStroi—1933–38*, p. 127.
[67] Verkhovnyi Sovet SSSR, *Sobranie*, p. 218.
[68] These were not specifically named, but merely defined as "some other higher educational establishments in the fields of industry, transportation, agriculture, medicine, pedagogy not mentioned on the preceding list" (i.e., the 85 engineering institutes plus Moscow and Leningrad State Universities).
[69] *VyshkoSPR—1957*, p. 429.
[70] *Ibid.*, p. 433.
[71] *Ibid.*, pp. 432–34.

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eligible; [72] students who have one or more "poor" grades are automatically ineligible. As in the past, stipends are granted for one term only, and then are subject to renewal. Although the selection of recipients is made by the committees mentioned above, those chosen receive their formal stipend appointments from the director (or rector) of the higher educational establishment concerned. Similar procedures apply to stipend awards in secondary specialized educational establishments; however, the stipends are smaller, ranging from 80 to 200 rubles per month depending upon the institution and the year of study. Stipends are paid only to regular (full-time day) students. Extension-correspondence and evening school students receive stipends only when they have unpaid leave of absence from employment in order to take examinations, prepare theses, etc.

In addition to the regular stipends described above, there are a number of so-called "personal stipends" (*personal'nye imennye stipendii*), ranging from 400 to 1,000 rubles per month. These are commemorative stipend grants established in the names of outstanding personalities of Russian and world science, scholarship and letters, as well as of distinguished communist political leaders. The total number of such grants is approximately 10,000 for the entire country, individual educational establishments having at their disposal anywhere from a single grant up to as many as several hundred in the case of the largest higher educational establishments such as Moscow State University. Stipends of this type are awarded only to truly outstanding students.

Thus, stipends are, in effect, the production incentives of the Soviet educational system. At the same time, through its control of the volume of financial aid to be allotted to students in specific educational institutions and its ability to set up varying scales of stipends for different types of schools, the Government can use the stipends as a means of channeling students into priority fields of training.

With regard to the question of what proportion of Soviet students in higher educational institutions receive stipend aid, relatively little information was available from Soviet official sources in the immediate postwar years. In 1950, however, it was reported that 75 percent of the students graduated from such institutions in that year received stipends.[73] There have since been other statements on the subject. For example, one report placed the proportion of regular students in higher educational establishments who received stipends in the 1956-57 academic year at 79 percent, and the proportion of semiprofessional school students receiving stipends at somewhat less.[74] Another Soviet source reported the overall percentage of stipend recipients in 1957 as "more than 80 percent." [75] In addition, various individual higher educational establishments have reported 70 to 85 percent of their enrolled students receiving stipends. On the basis of these reports, it seems safe to place the current national figure somewhere in the neighborhood of 80 percent.[75a]

Official Soviet figures for stipend allocations in the national budget are also available. In table I–3 the announced budget figures for 1957 are combined with estimates of the numbers of stipend recipients in order to arrive at estimated average annual and monthly stipend payments.

As shown in table I–3, the total amount allocated for stipends in the 1957 Soviet budget was about 7 billion rubles, or about 10 percent of the total budgeted expenditures on education in that year (see table I–2). The table further shows that stipend expenditures are concentrated almost exclusively in the areas of higher professional education and secondary specialized training. Stipends for higher educational establishments amounted to one-third of total outlays for higher education, and stipends for secondary semiprofessional schools to 29 percent of total outlays in that category.

[72] Special categories of students, such as Heroes of the Soviet Union and Heroes of Socialist Labor, former students of state orphanages, the deaf and blind, and "special governmental decree students" are entitled to stipends as long as they maintain passing grades.

[73] *VVSh*, No. 4, April 1951, p. 4.

[74] *Kommunist*, No. 15, 1957, p. 168; *Dos—1957*, p. 278. The proportion ranged from 72 to 76 percent.

[75] M. Kruglynskii, "College Education in the Soviet Union," *USSR*, No. 11 (26), 1958, p. 19.

[75a] According to the Soviet population census of January 1959 (*Vestnik statistiki*, No. 12, Dec. 1960, p. 4), the grand total number of persons receiving stipends (*stipendiaty*) was 1,718,000. If we assume that 84 percent of all full-time (day) students in higher education (1,100,000) and 72 percent of all full-time (day) students in semiprofessional schools (1,125,000) were receiving stipends, then 1,705,000 were receiving stipends, 995,000 of them in higher education and 810,000 in semiprofessional schools, with 13,000 unaccounted for.

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TABLE I–3.— *Stipend funds allocated in the national budget of the U.S.S.R., estimated number of recipients and average annual and monthly stipend, 1957*

Type of institution	(A) Budget for stipend expenditures (million rubles)	(B) Estimated number of stipend recipients	Average annual expenditure per recipient (rubles)	Average monthly expenditure per recipient (rubles)
Elementary and secondary schools	3.2	n. a.	n. a.	n. a.
Secondary specialized schools	2,139.2	970,000	2,210	185
Higher educational establishments	3,661.2	960,000	3,760	313
Advanced degree research, training in research establishments only	76.3	8,000	9,550	795
Subtotal	5,879.9			
Residual *	1,058.5	n. a.	n. a.	n. a.
Reported grand total	6,938.4			

* Includes stipends and payments to students in vocational-technical schools of the State Labor Reserve and various special schools (and possibly schools of the Communist Party). n. a.–not available.

Sources and notes:

(A) Ministerstvo Finansov SSSR, *Raskhody*, pp. 55, 57, 59.

(B) The estimated number of students in higher education receiving stipends is derived by assuming a proportion of 80 percent of total day students (appendix table IV–A–1–S) receive aid. For secondary specialized schools, the proportion of students on stipends is assumed to be 75 percent of total day students (appendix table III–A–1–S). For advanced degree students, the stipend fund for research establishments only was available.

While the data presented here point to the conclusion that the total amount of funds annually devoted to stipend subsidies in the Soviet Union is impressive, the question arises whether the average monthly stipend per recipient is adequate to enable the individual student to maintain himself while in school. In comparison with the average wage of Soviet workers and employees, students in higher education receive only from one-third to two-fifths as much. According to most available reports, this amount is barely enough to get by on,[76] and then only if the student sacrifices all luxuries, obtains dormitory accommodations (at minimal rent), and uses only university dining facilities. The student's monthly stipend at Moscow State University is higher than for most other schools and averages 400 rubles. One Western estimate of a student's monthly expenses at Moscow State University is as follows: Room (shared with another student)—25 rubles; food—at least 200 rubles; left for all other expenses—175 rubles.[77]

Only those engaged in advanced-degree training-research receive stipends approximately the level of the average worker's wage,[78] and thus presumably can keep their heads above water.

7. *Education Costs*

Table I–4 presents 1957 data on the allocation of educational expenditures in Soviet educational institutions. It may be noted that the major items in education costs are wages, accounting for 74 percent of the total cost in primary and secondary schools, 34 percent in secondary specialized schools, and 42 percent in higher educational establishments. While stipend expenditures in primary and secondary schools are negligible, they constitute the second highest cost item in secondary specialized schools (37 percent) and higher educational establishments (33 percent).

The allocation of educational funds for stipends to secondary specialized and higher education students has remained relatively stable over the years (1933—32 percent; 1950—33 percent; 1959—34 percent). Concerning this cost item, however, the present educational reforms in semiprofessional and professional education are relevant. The simple fact is that the deemphasis on fulltime education and the ex-

[76] A. G. Korol, *Soviet Education for Science and Technology*, New York: Wiley and Sons, 1957, pp. 177–178.

[77] *Novoe russkoe slovo* (New Russian Word), New York, May 5, 1958. It should be borne in mind that a copy of *Pravda* for a month would cost 60 rubles; the average book, about 15 rubles; and a man's suit, 1,200 rubles.

[78] Some "closed access" schools of the party and the military establishment, however, pay substantially higher stipends, in addition to living allowances.

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TABLE I–4.—*Educational expenditures by item in Soviet educational institutions, 1957*

Itemized expenditures	Primary and secondary schools		Secondary specialized schools		Higher educational establishments	
	Million rubles	Percent	Million rubles	Percent	Million rubles	Percent
Wages of teaching and service employees.	19,005.3	74.0	1,956.5	33.6	4,726.3	42.6
Social security and other contributions...	1,165.3	4.5	118.1	2.0	235.3	2.1
Office and maintenance expenses.....	2,126.2	8.3	311.3	5.4	451.7	4.0
Travel expenditures.....	47.8	.2	17.0	.3	21.0	.2
Expenses for teaching materials, industrial practice, research and library acquisitions.....	383.1	1.5	310.1	5.3	577.9	5.2
Stipends.....	3.2	negl.	2,139.2	36.7	3,661.2	33.1
Food expenses.....	5.7	negl.	178.0	3.0	23.8	.2
Purchases of equipment and furniture...	562.5	2.2	372.1	6.4	416.4	3.6
Capital construction.....	1,018.6	3.9	58.9	1.0	600.2	5.5
Capital maintenance and repair.....	1,276.0	4.9	180.4	3.1	230.8	2.1
Other expenses (unspecified).....	123.0	.5	183.8	3.2	161.2	1.4
Grand total.....	25,716.7	100.0	5,825.4	100.0	11,105.8	100.0

Sources: Ministerstvo Finansov SSSR, *Raskhody*, pp. 50, 55, 57; V. E. Komarov, *Ekonomicheskie osnovy podgotovki spetsialistov dlia narodnogo khoziaistva* (Economic Foundation for the Training of Specialists for the National Economy), Moscow, 1959, p. 134.

pansion of evening and extension-correspondence training will reduce considerably the amount spent on stipends.

The annual cost of maintaining a student in a higher educational establishment is reported to be 10,000 to 12,000 rubles,[79] of which about 2,500 to 3,000 rubles go for stipend payments. This direct cost refers again to the expenditure of funds allocated from the national budget only. Similarly, it is estimated for 1957 that "in engineering schools the average cost of training one student through the entire period of his course comes to more than 60,000 rubles.[80] About one-third of this is said to be spent on stipends.

Another Soviet source estimated that the direct (i.e., national budget funds) costs of educating specialists averaged as follows: [81]

	Cost per semiprofessional graduate (current rubles)	Cost per professional graduate (current rubles)
1940.....	7,800	22,800
1946-50.....	15,800	48,400
1951-55.....	16,300	39,600
1956.....	12,100	41,300
1957.....	11,600	41,600

[79] *Sovetskaia Belorussia*, Mar. 4, 1958.
[80] *USSR*, No. 11 (26), 1958, p. 19.
[81] V. E. Komarov, *Ekonomicheskie osnovy podgotovki spetsialistov dlia narodnogo khoziaistva* (Economic Foundation for the Training of Specialists for the National Economy), Moscow, 1959, p. 141.

It is argued that the emphasis on evening and extension-correspondence training in recent years has helped to bring down the cost per graduate. For example, in 1956 while the cost of engineering education in the full-time day program ranged from 43,000 (mechanical engineering) to 64,200 (geology and mining engineering) rubles, the cost of engineering training in evening programs averaged 13,300 rubles per student and in extension-correspondence programs, only 5,700 rubles.[82] It is suggested, therefore, that the further shifting of students into training programs of the evening and extension-correspondence types, as postulated by the educational reforms, will effect an even greater reduction in the cost of specialized education.

Thus the issue of economy of cost was also present in prompting the educational reforms. Reducing the cost of education has been discussed a number of times in the Soviet press. One aspect of this question is that the existing facilities, already overburdened and inadequate, would experience further pressure if a greater number of students were allowed to study on a full-time basis. Apparently the government is unwilling to make a major investment in new buildings and would prefer to rely upon the existing network of school facilities with only

[82] *Ibid.*, p. 144.

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modest additional outlays for modernization and some new construction.

Another aspect is that in the upper grades of the secondary school, particularly in the semiprofessional schools, and in higher educational establishments, the expansion of extension-correspondence programs, as well as the new "sandwich" programs of part-time study and part-time work, will reduce substantially the requirements for student scholarships and subsidies.

Table I–5 summarizes data on the direct per-student cost (i.e., budgetary outlays) of education in primary and secondary schools, semiprofessional schools and higher educational establishments for selected years.

TABLE I–5.—*Annual cost of education per student in Soviet educational institutions, selected years 1933–59*

	1933	1940	1950	1959
I. Primary and secondary schools:				
Budgetary expenditures (billion rubles)	1.7	8.9	20.1	30.0
Enrollment (millions)	22.1	35.5	34.7	33.4
Expense per pupil (rubles)	77	250	580	900
II. Semiprofessional schools:				
Budgetary expenditures (billion rubles)	0.6	1.8	4.4	5.2
Total enrollment (thousands)	589	975	1,298	1,907
(Full-time day only)	(589)	(787)	(1,065)	(1,067)
Expense per pupil	1,020	1,850	3,380	2,730
(Per full-time pupil)	(1,020)	(2,290)	(4,130)	(4,870)
III. Higher education:				
Budgetary expenditures (billion rubles)	1.1	2.9	7.2	11.5
Total enrollment (thousands)	458	812	1,247	2,267
(Full-time day only)	(458)	(558)	(818)	(1,146)
Expense per student	2,400	3,570	5,780	5,070
(Per full-time student)	(2,400)	(5,200)	(8,800)	(10,100)

Sources: Text table I–2; enrollment data from appendix tables II–A–1; III–A–1–S; III–A–1–E; IV–A–1–S; and IV–A–1–E.

It is particularly interesting to observe that the cost per student rose very sharply between 1933 and 1959 in primary and secondary schools. This was because in 1933 most of the schooling offered was on the elementary level, but by 1959 junior and senior secondary schooling had been well established. Also if the offsetting economies because of evening and extension-correspondence programs were not considered in semiprofessional and particularly higher education, the educational cost per student would have been substantially higher. In higher education, for example, the average cost per student would have been about twice as high if all students were enrolled in full-time programs.

The data in table I–5 further indicate that in 1959 it cost about 9,000 rubles per student for the complete 10-year school. The cost of training a semiprofessional student ranged from 5,460 to 10,920 rubles for the 2- and 4-year course, respectively. The average cost of training a professional with higher education was 25,350 rubles. If in both these latter cases only full-time students were considered, the cost would be increased one-third and twofold respectively.

Whatever economies are obtained through the part-time programs, it should be clearly recognized that the cost to the state of training specialists is 1.5 to 2.5 times higher for the semiprofessional and 2.5 to 5 times higher for the professional than for ordinary secondary school graduates. It is this practical economic consideration which influenced Soviet planners to operate a highly selective educational system which is designed to train specialists of the type and in the numbers required by the overall national plan.

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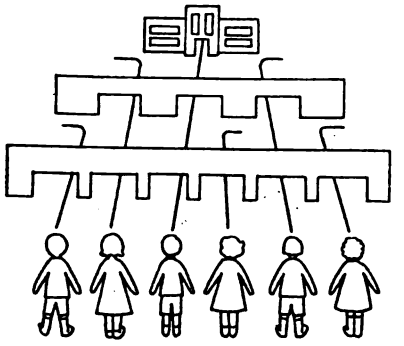

CHAPTER II

Soviet Primary and Secondary Education

It is universally recognized that the effective functioning of any system of public education depends, in large measure, upon the thorough coordination and integration of instruction at all levels of the school structure. The Soviet authorities assert that these requirements are more fully attained under their educational system than under any other, in the first place because it operates within the overall Soviet system of national planning, and in the second place because one of the basic principles upon which it is founded is the mutual "interlinking" (*priemstvennost'*) of all levels of education.[1] This principle, they claim, assures that instruction at each successive school level is fitted into a gradually progressing and coordinated pattern of education. They also claim that the Soviet system, because it embraces the whole range of education from preschool training through advanced-degree study and research, has no "dead-end" schools—i.e., schools providing education specifically intended to be terminal in the sense that the student is thereafter denied the opportunity to receive further education. To what extent these claims are true is one of the questions that will be considered in the course of the detailed discussion of the successive levels of Soviet education, beginning in the present chapter with the elementary (including preschool) and secondary stages of general education schooling.

[1] *Medynskii—1955*, p. 14; *Pravda*, June 10, 1959. The latter article extols *"priemstvennost' i posledovatel'nost'"* (interlinking and sequence of education on all levels).

Literacy in the Soviet Union

There is no question, of course, that the great emphasis placed by the communist regime from its inception on the development and expansion of education brought about a fairly rapid rise in the literacy rate of the population as compared with the pre-Revolutionary period. A major source of difficulty in appraising Soviet official literacy statistics, however, is the fact that no two rates are comparable unless (1) they are based on a uniform definition of what constitutes "literacy" and (2) both relate to the same age-span of the population. Yet, in frequent instances, literacy rates are given in Soviet sources without any clear indication of these basic terms of reference.

In pre-Revolutionary Russia "literacy" was defined as "the ability to read and write proficiently," which was ascertained by a standard test, and on the basis of this rather exacting criterion, the rate of literacy for the *entire* population was estimated at approximately 33 percent in 1913. No such standard test has been required in the population censuses during the Soviet era (censuses of 1926, 1939, and 1959). Table II–1 provides a summary of officially published Soviet statistics comparing the literacy rates for specified age groups in Tsarist Russia as of 1897 with the corresponding rates for the Soviet population as of the censuses of 1926, 1939, and 1959. One point worth noting is that the rates of literacy are uniformly higher for the population of ages 9–49 than for the total

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TABLE II–1.— *Literacy rates in the Russian Empire and the U.S.S.R.*

	Percent literate—								
	Ages 9 and over			Among these—					
				Ages 9–49			Ages 50 and over		
	Male	Female	Total population	Male	Female	Total population	Male	Female	Total population
Total population:									
Feb. 9, 1897.....	35.8	12.4	24.0	39.1	13.7	26.3	20.5	6.5	13.3
Dec. 17, 1926.....	66.5	37.1	51.1	71.5	42.7	56.6	40.6	11.4	24.5
Jan. 17, 1939[a].....	90.8	72.5	81.2	95.1	83.4	89.1	64.3	24.8	40.8
Jan. 17, 1959.....	.....	.....	.....	99.3	97.8	98.5	.....	.....	.....
Urban population:									
Feb. 9, 1897.....	63.3	39.3	52.3	65.5	43.1	55.6	48.7	23.1	34.9
Dec. 17, 1926.....	85.3	67.6	76.3	88.0	73.9	80.9	67.5	35.9	49.4
Jan. 17, 1939[a].....	95.7	83.9	89.5	97.6	91.0	94.2	82.1	46.4	61.0
Jan. 17, 1959.....	.....	.....	.....	99.5	98.1	98.7	.....	.....	.....
Rural population:									
Feb. 9, 1897.....	31.1	8.6	19.6	34.3	9.6	21.7	17.0	4.1	10.5
Dec. 17, 1926.....	61.9	30.0	45.2	67.3	35.4	50.6	35.6	6.3	19.6
Jan. 17, 1939[a].....	88.1	66.5	76.7	93.7	79.2	86.3	56.7	15.8	32.2
Jan. 17, 1959.....	.....	.....	.....	99.1	97.5	98.2	.....	.....	.....

Sources: *Vestnik statistiki*, No. 6, June 1956, p. 90; *Pravda*, Feb. 4, 1960; *NarKhoz–1960*, p. 26.

[a] U.S.S.R. territory within pre-1939 boundaries. If Polish and Baltic annexations are included, the literacy rates in 1940 for the total population would be: Males–93.5; females–81.6; total population–87.3. The improvement in literacy rates thus indicated attests to the fact that the educational attainment of the annexed provinces before the Second World War was higher than that within the U.S.S.R. pre-1939 territory.

population above age 9 (including 50-year-olds and above), but that the differences are substantially greater in the three Soviet years than in 1897. Much more significant, however, is the extraordinary jump in the Soviet literacy rate between 1926 and 1939. While this may, in part, reflect the results of the vigorous anti-illiteracy drive carried out by the Soviet Government during the period of the first Five-Year Plan (1928–32),[2] there is ample reason to suspect that the extent of the rise may also reflect the adoption of lower literacy criteria in the 1939 and subsequent Soviet censuses. The 1959 census instructions state that for persons 9 years of age and older who have not had elementary education, the census should indicate whether a person reads and writes, or only reads, in any language, or else is illiterate.[3] Thus, even as late as 1959, it appears that writing was not considered a criterion for defining literacy.

Thus, it is clear that by manipulating the criteria of literacy or by altering the age group considered, the percentage of literates in the population can easily be made to appear more favorable than it actually is. It is perhaps through some such manipulation that some Soviet republics, for instance, are able to claim a literacy rate of 100 percent.[4] As shown in table II–1, Soviet census data in 1959 claimed 99.3 percent literacy for the population aged 9–49, a rate comparable to the March 1959 figure of 97.8 percent in the United States, where literacy (as in pre-Revolutionary Russia) is rigorously defined as the ability to read and write proficiently.[5] The accuracy of these Soviet figures, as indicated above, would appear to be doubtful. Nevertheless, it is beyond dispute that impressive gains have been made, and that illiteracy is no longer a significant problem in the Soviet Union, as it was three decades ago.

[2] It was officially claimed that 45 million additional persons were taught to read and write during the drive, bringing the rate of literacy up to about 90 percent by 1932. *Itogi pervogo FYP*, p. 222.

[3] P. K. Pod'iachikh, "O proekte programmy predstoiashchei v ianvare 1959 goda vsesoiuznoi perepisi naseleniia" (Concerning the Projected Program of the Forthcoming Census of Population in January 1959), *Materialy k vsesoiuznomu soveshchaniiu statistikov* (Material for the All-Union Conference of Statisticians), Moscow, 1957, p. 6.

[4] *Zaria vostoka*, Nov. 1, 1956.

[5] U.S. Department of Commerce, Bureau of the Census, *Current Population Reports, Population Characteristics*, Series P–20, No. 99, Feb. 4, 1960, p. 2.

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Preschool Education in the U.S.S.R.

Although the educational reform program formally adopted in December 1958 had made no mention whatever of preschool education, this oversight was remedied in May 1959 with the promulgation of a decree calling for a general reorganization and expansion of preschool child-care facilities.[6] The decree provided that the two existing types of child-care facilities, the creches and nursery schools, should be reorganized into a single consolidated type of facility to be designated as "preschool children's institutions." These were to be administratively supervised by the respective republic Ministries of Education and to apply a uniform program of child training prepared by the RSFSR Academy of Pedagogical Sciences and the U.S.S.R. Academy of Medical Sciences. The decree further stipulated that these facilities should be expanded so as to permit a doubling of the existing enrollment, announced in 1959 as 3.4 million children,[7] by 1965.

1. *Creches*

Although creches are regarded as preschool educational establishments, their primary function is to provide nursing care for infants up to about age 3 for a period of 9 to 14 hours daily, under the supervision of the public health administration. If we give full credence to Soviet pronouncements, creche facilities in the prewar period (1938–39) were only enough to care for 700,000 to 800,000 children, or about 7 percent of all children in the pertinent age group.[8] In the postwar period, Soviet sources have given considerably less publicity to creches than in the prewar years. Despite the probability that creche facilities were increased after the war, the expansion undoubtedly has not been great enough to alter radically the situation which prevailed in the late 1930's.

Indeed, until the release of statistical data by the Soviet Government in 1957, Western observers were largely in the dark about current trends in creche infant care. However, the new data (see table II–2) largely confirmed earlier conjectures that creche facilities were far less plentiful than Soviet propaganda had claimed. The approximate availability of these facilities can be judged by comparing the total accommodation capacity of permanent creches with the number of infants normally born in a single year. Since the number of births in most "normal" years in the U.S.S.R. (excluding, of course, years of famine or war) has been about 5 million[9] and total accommodation capacity of creches was only about 800,000 as of 1938–39, it follows that permanent, full-time creche facilities were sufficient to accommodate less than 15 percent of the infants born each year,[10] and less than 5 percent of the infant population up to and including age 3—the age group which they were supposed to accommodate. Apparently, the great majority of Soviet infants continue to be cared for in the home, particularly by the grandmother, since statistics indicate that there are many more mothers employed than there are creche places available to accommodate their children.

As evidenced by the data presented in table II–2 below, the rapid 10-fold growth of creche care during 1929–32 was followed by a far less spectacular expansion thereafter: in 1959 only twice as many infants could be accommodated in permanent child-care facilities as in 1932. In the course of the 25 years 1932–56, only urban creche capacity increased; in rural areas, there was a marked decline.

It is important to note that enrollment figures for seasonal creches, set up primarily during the summer, mostly in rural areas, are not included in regular creche statistics. However, these creches also accommodated a substantially smaller number of children in the 1950's than before the Second World War.

The quality of accommodations offered by individual creches varies greatly. Most of them

[6] The decree, issued in the names of the Central Committee of the Communist Party and the U.S.S.R. Council of Ministers, was officially entitled, "Concerning Measures for the Further Development of Preschool Facilities, Improvement of Upbringing and Medical Services for Children of Preschool Age." *Pravda*, May 28, 1959.

[7] *Pravda*, May 29, 1959.

[8] This statement is based on 1938 creche data and the population census of 1939. *SotsStroi—1933–38*, p. 134; and F. Lorimer, *The Population of the Soviet Union: History and Prospects*, Geneva: League of Nations, 1946, p. 238.

[9] This is consistent with reporting of the number of births for selected years as given in *NKh–1957*, p. 269, and *NarKhoz–1959*, p. 31.

[10] I.e., without accounting for infant and child mortality. If such adjustment were made, the figure would be slightly higher.

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TABLE II–2.—*The number of places in Soviet creches, 1913–59*

[In thousands]

Year	Number of places in permanent creches			Seasonal creches (maximum)
	Total	Urban	Rural	
1913....	0.6	0.6	none	10.6
1928....	62.0	54.7	7.3	197.8
1932....	600.9	258.4	342.5	3,920.3
1937....	718.2	378.1	370.1	n.a.
1940....	824.1	523.8	300.3	4,049.1
1950....	735.5	470.1	265.0	1,813.1
1955....	851.0	567.6	283.4	2,334.0
1956....	904.3	604.0	300.3	2,386.8
1957....	1,046.0	n.a.	n.a.	1,750.0
1958....	1,135.0	n.a.	n.a.	n.a.
1959....	1,208.0	n.a.	n.a.	n.a.

n.a.—Not available.

Sources: *SotsStroi—1933–38*, p. 134; *SotsStroi—1934*, p. 427; *NarKhoz—1960*, p. 792; Ministerstvo Zdravookhraneniia SSSR (Minister of Health of the U.S.S.R.), *Zdravookhranenie v SSSR: Statisticheskii spravochnik* (Health Care in the U.S.S.R: Statistical Handbook), Moscow, 1957, pp. 127–28; *Sovetskoe zdravookhranenie*, No. 1, January 1959, p. 63; *NarKhoz—1959*, p. 890. This latter source gives higher figures for several years than those in the table (i.e., 1940—859,000; 1950—777,000; 1955—907,000; 1956—966,000 for "total" number). Apparently these figures include additional *vedomstvennye* (departmental) creches, i.e., those operated by various administrations such as railroad transportation, etc.

are operated by economic enterprises, primarily to care for infants whose mothers are employed in the particular economic unit. If the unit is large and important, creche facilities are good. In some plants or concerns, the creches are housed in separate buildings where children can play and sleep under the supervision of nurses and sometimes of special teachers; in others, according to reports of recent visitors to the Soviet Union, the creche occupies several rooms in the main building of the plant. Creche service in rural areas—particularly seasonal creches—may amount to nothing more than feeding and general care by elderly peasant women while the mothers work in the fields. Often the "seasonal nursery" is nothing more than a pile of hay and a few blankets under a shady tree rather than a building or even a room.

2. *Nursery Schools*

Children from 3 to 6 years of age may be enrolled in nursery schools. Considered the first level in the Soviet educational system, the nursery schools perform a function similar on the whole to that of nursery schools in the United States, though Soviet children are kept in school about 9 hours daily and frequently even longer. Sample statistics for the Russian SFSR, for example, reveal that in 1957, out of 420,000 nursery school children, 63 percent, or 266,300, attended school up to 10 hours per day, and that the remaining 47 percent attended more than 10 hours per day.[11] Appendix table II–A–O provides detailed statistics on the number of Soviet nursery schools, enrollments and teachers, broken down by urban and rural areas. These data are summarized for selected years in accompanying table II–3.

The development of nursery schools in the U.S.S.R. has been primarily an outgrowth of the integration of women into the labor force, especially in urban industry. The Soviet state has controlled preschool activity since June 1918 when the Commissariat of Education was placed in charge of all nursery schools. Soviet sources report that in pre-Revolutionary Russia there were only some 300 nursery schools with a total enrollment of 4,000 children.[12] This figure probably is unreliable because there is no way of ascertaining the number of children enrolled in the many private nursery schools which existed at that time,[13] for such information simply was not compiled.

In the Soviet era, the greatest expansion of nursery school enrollment occurred immediately after the start of industrialization under the First Five-Year Plan (see table II–3). Nursery school enrollment increased 10-fold between 1927 and 1932, but then remained stagnant at a level of about 1,100,000 until 1940. Right after the end of the Second World War there were more children in Soviet nursery schools (1,471,000) than there had been in the late 1930's and again in the late 1940's. From 1950 to 1958 enrollment just about doubled. In 1959 the increase was about 13 percent over the enrollment in 1958. At this level, the nursery schools still accommodated only a small fraction of the children in the eligible age group. In

[11] *KS–RSFSR—1958*, p. 335. Note that the statistics cited do not represent a total count, but rather a selected sample.

[12] Zhirnov, *op. cit.*, p. 9.

[13] Before the Revolution there were three types of nursery schools: (1) those run by the Crown (Imperial Ministry of Education); (2) communal nursery schools (under the auspices of the *zemstvos*—provincial governments); and (3) private (both parochial and secular) schools.

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TABLE II–3.—*Total, urban and rural preschool educational facilities, enrollments and teachers in the U.S.S.R. for selected years, 1914–59*

Year	Number of nursery schools			Enrollment (thousands)			Number of teachers (thousands)		
	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
1914....	275	.....	.....	7.0	.....	.....	.....	.....	.....
1927....	2,155	1,932	223	107.5	99.1	8.4	6.1	5.8	0.4
1932....	19,611	10,979	8,632	1,061.7	710.2	351.5	52.1	37.9	14.1
1940....	23,999	14,427	9,572	1,171.5	906.4	266.1	75.2	55.0	20.2
1945....	28,436	17,932	10,504	1,471.0	1,113.6	357.4	101.3	77.7	23.7
1950....	25,624	17,055	8,569	1,168.8	958.1	210.7	92.6	74.3	18.3
1958....	36,800	24,300	12,500	2,357.7	1,947.6	410.1	191.9	157.5	34.4
1959....	39,900	26,300	13,600	2,671.1	2,197.3	473.8	216.4	177.1	39.3

Sources: Appendix table II–A–O; *NarKhoz–1960*, p. 737.

1939 there were about 1,130,000 children enrolled in Soviet nursery schools,[14] or less than 9 percent of the approximate total of 13 million children then eligible.[15] Plans to expand enrollment to 2,260,000 by 1950 were drawn up,[16] but the actual enrollment in regular nursery schools in that year was still only 1,168,000. Undoubtedly the declining number of children of nursery school age owing to the wartime birth deficit played a part in this situation, for there were fewer children in Soviet nursery schools in 1950 than in the years immediately after the war. In fact, the enrollment originally projected for 1950 was not reached until 1958, when 2,358,000 children were enrolled. The 1959 figure of 2,671,000 is the all-time high. The 1959 data also clearly indicate that the percentage of saturation in urban areas, where such services are most important, is substantially higher than in rural areas.

There has undoubtedly been some increase in the proportion of total population of nursery school age actually enrolled, although data are lacking to establish the amount of increase. Probably the proportion does not exceed—as a rough guess—15 to 20 percent. The 1965 target enrollment in nursery schools under the Seven-Year Plan is 4,200,000,[17] or almost double the 1958 enrollment. However, even if this target is attained, it is evident that the total enrollment will remain only a fraction of the child population of nursery school age.

[14] *Pravda*, Mar. 15, 1946 (Voznesenski speech on the 1946–50 plan).
[15] Lorimer, *op. cit.*, p. 238.
[16] *Pravda*, Mar. 15, 1946.
[17] *Ibid.*, Feb. 8, 1959.

It is also evident from table II–3 that from 1932 to 1959 nursery school enrollment in rural areas increased only by 100,000, to 474,000, whereas urban enrollment more than doubled. In fact, during this period, nursery school enrollment in rural areas as a proportion of total enrollment in both urban and rural nursery schools declined from about 23 percent in the late 1930's to 17 percent in 1958. General population trends and the shift of population from rural to urban areas are partially, but by no means wholly, responsible for this pronounced disproportion between the availability of preschool educational facilities in urban and rural areas.

Soviet nursery schools, like the creches, are largely operated by economic enterprises. In 1955, enrollment in some 32,000 Soviet nursery schools,[18] divided into categories according to the operating authority, was distributed as follows:

	Enrollment, 1955	Distribution in percent
Nursery schools of republic Ministries of Education....	600,000	34.7
Nursery schools of various economic enterprises and administrations.....	1,100,000	63.6
Nursery schools of collective farms.....	30,000	1.7
Total regular enrollment.....	1,730,000	100.0
Seasonal nursery schools.....	c. 1,000,000	n.a.

The enrollment figure for nursery schools run

[18] *KS–1956*, p. 192.

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by collective farms represents only 10 percent of *total rural* nursery school enrollment (i.e., 308,000 in 1955), the remaining 90 percent being enrolled in schools operated by other rural units such as state farms, procurement organizations, and repair-technical stations. Collective farms are currently being urged to build and maintain more nursery schools with farm funds.[19] As in the past, the state is shifting the burden of financing these establishments onto the collectives.

Again it is evident from table II–3 that the average enrollment per nursery school has been increasing significantly in recent years (1950–45, 1958–64 children per school). But the average class, as indicated by the pupil-teacher ratio, remains quite small. Official pronouncements have indicated that the capacity of nursery schools will be further increased by augmenting the average size of units and constructing new schools of standard design.

The pupil-teacher ratio in nursery schools improved very significantly between 1932 and 1940, the number of pupils per teacher dropping by one-half. In 1950 there were about 13 children per teacher, and each nursery school had an average of four teachers. In 1958 the ratio was still about the same as in 1950 (12.5 pupils per teacher), but the average number of teachers per nursery school had risen to five. These trends clearly imply that the number of classes handled by individual nursery schools has increased.

Nursery schools in the Soviet Union[20] and in the United States differ in two respects, even though they are not dissimilar in function. One difference is that Soviet nursery school training already begins the process of indoctrination, inculcating patriotism and obedience to Soviet leadership.[21] The second is that most Soviet nursery schools, in addition to the usual games, organized play, singing and gymnastic exercises, give rudimentary instruction in reading and arithmetic. This gives children who have attended nursery schools some advantage over those who have not, when they enter the first grade of the primary school. It should be noted, however, that this does not mean that Soviet children who attend nursery school necessarily start learning reading and arithmetic at an earlier age than children in the United States.[22] Children in the Soviet Union often are still in nursery school at age 6, whereas 95 percent of American children, by that age, are already in the first grade of elementary school, where they also are receiving rudimentary instruction in the same subjects.

The May 1959 decree providing for the reorganization and expansion of preschool educational facilities called upon Soviet economic and other organizations to expand such facilities under their control and to establish favorable priorities for the allocation of construction materials, furniture and equipment.[23] At the same time, the decree called for an intensification of measures to popularize preschool education and encourage parents to enroll their children in the reorganized "preschool children's institutions." It would appear from this that the Soviet public has not completely accepted the nursery school system. This coolness is especially significant because one of the principal objectives of the expansion of preschool facilities is to permit more extensive use of female labor to counteract the manpower shortage in the 1960's. Soviet planning experts also place heavy reliance upon the expansion of preschool facilities as a means of *retaining* already employed women in the active labor force.[24]

Expansion of these facilities is planned on both an extended day (i.e., 12 hours plus) as well as on a boarding basis (full day for 6 days). The prospect of developing extensive boarding school facilities in the near future is not favorable because of the extremely high costs involved. But even though spectacular growth in this particular type of preschool institution is unlikely, it is of considerable significance from the standpoint of its potential sociological ef-

[19] *Uchitel'skaia gazeta*, Sept. 22, 1959. This is one of such articles which appeared after the issuance of the May 1959 decree concerning the expansion of preschool facilities.

[20] *OE–U.S.S.R.*, pp. 43–48. The description of the function and operation of nursery schools presented in this source is adequate, but unduly idyllic and lacks realistic appraisal.

[21] MP RSFSR, Danev, *op. cit.*, pp. 272–73. Decree of the RSFSR People's Commissariat of Education, Dec. 15, 1944, entitled "Rules for Nursery Schools."

[22] It should be noted again that Soviet nursery schools are not to be equated with kindergartens or "transition" grades in the U.S. school structure in the sense that the former are essentially child-care facilities for children aged 3–6.

[23] *Pravda*, May 28, 1959.

[24] *Trud*, Jan. 22, 1959 (article by B. Braginskii, Soviet planning expert, on manpower requirements).

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fects in further weakening the cohesiveness of the Soviet family.

General Aims of Soviet Primary and Secondary Education

In recent years the broader aspects of Soviet primary and secondary education, as well as the impact upon it of ideological, political, and cultural factors, have received considerable attention from Western observers.[25] To avoid duplication of these efforts, the present study will forego discussion of topics which have been fully treated elsewhere and will concern itself primarily with a factual account of developments in Soviet education.

The major distinguishing features of Soviet primary and secondary education may be briefly stated as follows: [26] (1) Monopoly control by the state over all educational practices; (2) the complete secularization of education; (3) the integration of productive work with educational training; (4) the inclusion of physical and military training; (5) intensive political indoctrination both in and out of school through partisan youth organizations; and (6) extensive emphasis on scientific-technical subjects at all levels of education.

The features which have been most frequently—and quite properly—stressed in Western studies are the monopoly of the state and the emphasis on political indoctrination. There is no question whatever that every aspect of educational policy and practice in the Soviet Union is firmly controlled by the central organs of the Communist Party, acting through both the administrative machinery of the state and the party apparatus. Marxian doctrine, as modified and extended through interpretation by the central party organs or by the dictator controlling them, continues to be a powerful influence in shaping Soviet educational policy. No religion, no private school or instruction, no ideas alien to the official dogma, are tolerated by the Soviet regime. Whatever older pre-Revolutionary influences or Western ideas creep into Soviet education, they are fragmented and distorted to fit into the current political and ideological framework. A materialistic outlook and service to the state are the guiding principles of instruction. Ideas, facts, history, biology —the entire mosaic of knowledge—are taught in conformity with the prevailing official interpretation.

In Marxist disquisitions, education of the "whole man" was envisaged as the ideal,[27] to be achieved through a combination of intellectual, physical, and polytechnical education. The education of the "whole man," whether in the image conceived by Marx, Dewey or any of the other educational philosophers, is an exercise in the realm of the ideal; and unless the parts which make up the "whole" are defined, the concept remains abstract and unreal. Actually, it is true of most educational settings that certain "parts" of the "whole man" are developed more than others. Whatever the philosophic rationale may be, this is also true of the Soviet educational system.

The Soviet primary and secondary school represents the *only* part of the whole educational complex which theoretically might educate the "whole man"; yet it has become "a cog in the machinery of planned economy" and thus seeks "to educate man to be a functional unit." [28] Through their curriculum, instruction practices, and processes of selection, the primary and secondary schools provide, not "general," but functionally oriented education. No other educational institution in the Soviet Union even claims to offer "general education."

The functional emphasis in Soviet primary and secondary education is a relatively recent development. Until the mid-1950's, primary and secondary schooling was intended primarily to lay the groundwork for higher education, weeding out the less competent and providing those of demonstrated ability with a foundation of

[25] Korol, *Soviet Education;* Counts, *The Challenge of Soviet Education;* *OE–U.S.S.R.;* G. L. Kline (ed.), *Soviet Education* (9 essays by former Soviet citizens), New York: Columbia University Press, 1957; Bereday, Brickman and Read, *op. cit.;* and Office of Education, *Soviet Commitment to Education.*

[26] See N. Hans, *Comparative Education,* London: Routledge & Kegan Paul, Ltd., 1949; I. L. Kandel, *Comparative Education,* Boston: Houghton Mifflin Co., 1933; and B. King, *Russia Goes to School,* London: William Heinemann, Ltd., 1948.

[27] H. Wittig, "Marx on Education: Philosophical Origins of Communist Pedagogy," *Soviet Survey,* No. 30 (Oct.–Dec. 1959), 77–81. For an extensive discussion, see M. J. Shore, *Soviet Education: Its Psychology and Philosophy,* New York: Philosophical Library, 1947, *passim.*

[28] Wittig, *op. cit.,* 81.

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general academic knowledge. Since then, however, first through a process of piecemeal adjustment and then by radical institutional reform, primary and secondary schools have become institutions for turning out students trained in labor skills and ready for employment, with the possibility of receiving further specialized training later. This reorientation did not, however, change the ideal precepts embodied in Soviet pedagogy.

Soviet pedagogical theorists distinguish five basic components of primary and secondary "general education."[29] These elements incorporate the theoretical aims of Soviet "general education" and are supposedly embodied in educational practice:

(1) *Physical education,* aimed at developing health and physical strength through curricular instruction and/or extracurricular participation in sports.

(2) *Esthetic education,* aimed at developing appreciation of "artistic realism" among all students and/or mastery of a "performing arts skill" by those who are particularly gifted.

(3) *Mental education,* aimed at the mastery of all subjects of instruction; the development of a conscious scientific and materialistic outlook; mastery of the dialectical method; and orderly and systematic study and thought habits.

(4) *Polytechnical education,* aimed at developing a specific manual skill; detailed familiarity with methods and techniques of production of a given type; and a general knowledge of production techniques and the organization of socialist industry.

(5) *Moral education,* aimed at creating a "conscious communist morality," the elements of which are: conscious discipline; Soviet patriotism and proletarian internationalism; dedication to the goals of the community, the state, and the Communist Party; dedication to socialist labor; and acceptance of approved common rules of conduct and etiquette.

These components are said to represent a "new, superior stage in the development of the theory and practice of education."[30]

All of these ideal goals have a part in determining the content and methodology of Soviet education. The problem, however, is to determine where the dominant emphasis is placed in actual Soviet educational practice. Because the communists themselves declare that their educational system is first and foremost oriented toward the development of the ideal personality—"the new Soviet man"—many observers contended that "*moral education*" of the communist type is most important. This does play an important role in the educational process, to be sure; but it does not necessarily shape the content of education. Until the mid-1950's the content of Soviet education reflected a dominant emphasis on academic education; since then, the dominant influence has been *polytechnical education. Physical education* and, in particular, *esthetic education* have had relatively small roles. The assignment of relative weights to the various areas of Soviet general education is subject to certain limitations since it is obvious that these areas are not separate and mutually exclusive. Communist moral education, for example, impinges upon academic education in the form of political bias in the subject matter of instruction; academic education in turn influences polytechnical education, and so forth. Hence, any assignment of weights can only be approximate.

Polytechnical Instruction in Soviet Primary and Secondary Schools

There are three main stages in the historical development of Soviet primary and secondary education. The first dates from the time of the Revolution until the early 1930's. The Revolution marks an abrupt change and the establishment of a new order in education. This was a phase of grandiose experiments, with emphasis on polytechnism. Although the year 1931 may be singled out as the turning point of this period, some of the tendencies of the late 1920's carried over into the mid-1930's. The second period, which can be considered as a period of return to traditional academic schooling, comprises the years from the early 1930's until the mid-1950's. The 19th Party Congress in 1952 showed the first signs of a new turning point, but perhaps not until the death of Stalin in 1953 did the actual adjustment in educational policy begin to take place. From the early 1950's until 1958 there was a period of slow transition,

[29] I. T. Ogorodnikov and P. N. Shimbirev, *Pedagogika* (Pedagogy), Moscow, 1950, especially pp. 59–72; P. N. Shimbirev and I. T. Ogorodnikov, *Pedagogika* (Pedagogy), Moscow, 1954, especially pp. 15–32.

[30] N. K. Goncharov, "Sovetskaia pedagogicheskaia nauka" (Soviet Pedagogical Science), *Narodnoe obrazovanie,* No. 11, Nov. 1957, p. 70.

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which culminated in an abrupt cutoff in 1958 in the form of Khrushchev's educational reform. By 1960 Soviet education had progressed into this third stage, with extensive experimentation in a new blend of academic and applied instruction. In each of these stages the cardinal concepts of communist education—labor and polytechnical education—played a decisive role in shaping actual educational practices.

No aspect of Soviet education, past or present, has aroused as much controversy as polytechnical training.[31] Yet no phase of Soviet educational policy has been so neglected and so frequently misinterpreted. Neither extensive theoretical studies [32] nor brief surveys of the practices of Soviet "polytechnical" education [33] have done full justice to this important and extremely complex topic, nor does the present study pretend to do so. As interpreted by communist educators, "polytechnism" is a concept of so many dimensions that it is difficult to avoid slighting or overlooking some of them. However, the current educational reforms have elevated it to a position of key importance in Soviet educational policy,[34] and the subject therefore merits particular attention.

1. *The First Phase: The Roots of Polytechnism*

Polytechnical education (or polytechnism, as it is often called) is an essential ingredient of the Marxian theory of education: [35] indeed, it forms the *central pillar* of Marxist educational philosophy founded upon a utopian conception of human nature and the future communist society. Marx envisaged that the individual under communism would enjoy the opportunity to achieve the all-sided development of his capabilities—a condition which, Marx claimed, was unattainable under capitalism because of the division of labor. In the communist society, distinctions between different forms of labor would vanish, the unification of mental and physical labor would be realized, and education would give every individual uniform, integrated training in both the theory and the practice of all branches of production. It is this concept of integrated training which is the basis of polytechnism. In Marx's educational scheme there was no provision for a separate kind of labor education: to him labor education and the education of labor were one and the same thing and were embodied in the principle of polytechnical education, which forms one of the three pillars of communist education along with physical and esthetic training. Marx believed that, provided this opportunity, the individual would seize it, and thus free himself from the fetters of narrow, specialized development.[36]

Thus, in essence, polytechnical education as conceived by Marx did not signify one-sided vocational education or specialized labor training. Yet, despite the fact that Marx's concepts are still cited by Soviet ideologists and educators as the continuing basis of Soviet educational policies, they have in fact been reinterpreted and applied in ways quite contrary to the intention of their formulator. In practice, polytechnical education has assumed many forms—instruction in manual labor and, particularly, in applied industrial and agricultural techniques, vocational training of one sort or another, productive work in school workshops, laboratory work in scientific subjects, the use of visual aids in teaching, excursions to in-

[31] For a survey of the present polytechnical instruction measures, see W. K. Medlin, C. B. Lindquist, and M. L. Schmitt, *Soviet Education Programs*, Bulletin 1960, No. 17, Washington, D.C.: U.S. Department of Health, Education and Welfare, Office of Education, 1960.

[32] Shore, *op. cit., passim.*

[33] *SPM*, pp. 34–37; Korol, *Soviet Education*, pp. 27–32. *OE–U.S.S.R.* does not have a separate section devoted to this topic. See also I. Nikodimov, *O politekhnicheskom obrazovanii v SSSR* (Concerning Polytechnical Education in the U.S.S.R.), Munich: Institute for the Study of the U.S.S.R., 1957; Wittig, "Marx on Education," and the same author's "Die Marx'sche Bildungskonzeption und die zweite 'Polytechnisierung' der Sowjetschule," *Das Parlament*, 10 Dec. 1958. The most recent contribution is by R. V. Rapacz, "Polytechnical Education and the New Soviet School Reforms," in Bereday and Pennar, *op. cit.*, pp. 28–44.

[34] It should be noted that the evolution of Soviet policy regarding politechnism is a topic on which most post–1952 Soviet sources are extremely unreliable. For example, E. P. Pichugina (*Pravo na obrazovanie v SSSR* [The Right to Education in the U.S.S.R.], Moscow, 1957, p. 48–55) goes in one easy jump from Lenin's statement on polytechnism in 1919 (p. 49) to the declaration on the same subject by the 19th Party Congress in 1952, and everything in between and since is assumed to be constant.

[35] For an extensive discussion of the origins, development and ideological implications of this concept, see Shore, *op. cit.*, especially pp. 146–150, 227–240. It is interesting to note that Marx, in developing the concept of polytechnical education, was profoundly influenced by the British factory school system and the ideas of the utopian socialists, especially Robert Owen.

[36] Marx and Engels, *Sochineniia*, vol. V, pp. 265–270, 318–320.

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dustrial plants, etc. In fact, almost anything short of a textbook or a teacher's word has been referred to as "polytechnical instruction" at one time or another. Since there were so many instruction efforts which were called polytechnical, these policies have failed to gain precise and meaningful expression. The content of polytechnical education has also varied in different periods. But, from the standpoint of educational policy, it is primarily the emphasis or deemphasis of polytechnism, rather than the diversity of its forms, which is of fundamental importance as an indication of the extent to which Soviet general education schools have been directly involved in practical labor training. Polytechnical education was emphasized during the first stage of Soviet educational development until the early 1930's; it was deemphasized during the second, from the early 1930's until the 1950's; and today the emphasis is greater than ever.

Lenin was clearly in basic theoretical agreement with Marx on the role of polytechnical education in the Soviet system.[37] Soviet legislation concerning public education in the wake of the 1917 Revolution invariably emphasized Lenin's ideas of "free, universal and compulsory general and polytechnical education, familiarizing in theory and practice all youths of both sexes up to age 16 with all the major branches of production" and assuring "close unity of education and socially productive work." [38]

On October 16, 1918, the Soviet Government issued a decree on the "Unified Labor School," in which the polytechnical principle was designated as the basis of Soviet education. In March 1919 the 8th Congress of the Communist Party adopted a policy directive calling for "universal and compulsory general and polytechnical education" for all youths up to age 17.[39] In December 1920 there was a special party conference on public education which devoted most of its attention to problems of a "unified labor school" and polytechnical instruction. In 1921 the Soviet Government was obliged to retreat from the 8th Congress policy by lowering the educational age limit from 17 to 15, but it reaffirmed the principle of universal general and polytechnical education.[40]

This first period of Soviet educational development was marked by grandiose plans, sweeping pronouncements, lofty slogans—and meager results. Until about 1926–27, there was much talk of applying Marx's concepts of polytechnical instruction, but neither the facilities, teaching staff nor a comprehensive instruction program could be provided. When one reads the directives and regulations of the *Narkompros* (People's Commissariat of Education) for the early and mid-1920's, one is immediately struck by their preoccupation with financial and material problems—where to get money to pay the teachers and how to scrape together enough resources to avoid having to close down the schools altogether! During this period the very concepts of organized learning were ambiguous and uncertain. Often the so-called "proletarization of education"—i.e., giving preferential treatment to workers and their children regardless of intellectual capacity—was regarded as enough to implement the aims of polytechnism. Nevertheless, labor and laboring activity were the center of polytechnical education as interpreted in the 1920's.

This period of Soviet educational evolution was unique in other respects as well. From the Revolution up until 1931, the educational system was highly experimental and permissive.[41] The 1920's have been described by some observers as a phase of Soviet education marked by courageous and brilliant experimentation with the ideas of Western liberal educators (Dewey, Kerschensteiner, Decroly, Parkhurst, Montessori). This judgment, however, is not shared by the vast majority of impartial observers, by former Soviet teachers, and even by the authors of most Soviet educational pronouncements after 1931, all of whom have characterized the state of Soviet education in

[37] See, for example, Lenin's article on Marx in the *Granat Entsiklopedicheskii Slovar'* (Granat's Encyclopedia), St. Petersburg, 1914–16; and a convenient summary of Lenin's views on polytechnical education in *Uchitel'skaia gazeta*, Apr. 23, 1955. See also V. I. Lenin, *Stat'i i otryvki po voprosam narodnogo prosveshcheniia i shkoly* (Articles and Passages on Questions of Public Education and Schools), Moscow, 1938.

[38] A photoreproduction and transcript of Lenin's theses of the Communist Party program for public education may be found in *Narodnoe obrazovanie*, No. 11, Nov. 1957, pp. 7–8.

[39] MP RSFSR, N. I. Boldyrev (comp.), *Direktivy VKP(b) i postanovleniia sovetskogo pravitel'stva o narodnom obrazovanii: sbornik dokumentov za 1917–1947 gody* (Directives of the Communist Party and Decrees of the Soviet Government Concerning Public Education: Collection of Documents for 1917–47), vol. I, Moscow, 1947, p. 8.

[40] *Ibid.*, p. 26.

[41] Bauer, *The New Man in Soviet Psychology*, pp. 43–46.

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the 1920's as senseless and deplorable. As one prominent Soviet educator remarked during a recent visit to the United States, "In those days we dived without knowing if there was any water beneath us."

But even if it were true that this period was marked by greater willingness to experiment with the ideas of Western liberal educators, the fact remains that these ideas did not find fertile soil, and that there was no real understanding of the fundamental philosophical basis of Western educational precepts. This is still true in the Soviet Union today. In any event, Soviet attempts to transplant vulgarized versions of progressive educational ideals in "proletarian soil," and to apply them in the late 1920's largely in the arena of productive labor education, resulted in the erosion and downgrading of the entire educational process. In addition to the major pedagogical groups led by A. V. Lunacharskii, N. K. Krupskaia, S. T. Shatskii,[42] P. P. Blonskii, A. P. Pinkevich, S. A. Kamenev, V. N. Shul'gin and others, there were dozens of minor splinter groups, all of which laid claim to the superiority of their own respective ideas of how the educational system should be organized and how it should function.

One frequent subject of controversy during this period was the notion of the "withering away of the school." [43] Some radicals advocated that formal schooling be replaced completely by labor practice and the mere observation of life and one's actual environment. Others put forward an educational formula of "work and study" under the slogan, "Brave Life." There were also the Dalton Plan; the group or brigade method of education, which, among other idiosyncrasies, proposed to divide the task of learning the multiplication tables among the members of the group (!); the student council plan, under which students would vote to decide what to study next. Although the *GUS* (*Gosudarstvennyi Uchenyi Sovet*—State Academic Council—of the *Narkompros,* which existed from 1919 through 1931) claimed that it had worked out a complex educational program,[44] some of these experimental ventures lacked any specification whatever of the actual content of educational instruction. "Learning through doing" was considered applicable to anything from scrubbing floors and building roads to composing "collective poems." Collectivism was practiced to such an extreme that individual learning was replaced by group practice, and individual grading by amorphous group performance criteria. Social and political participation overshadowed all other pursuits. The teacher's authority was nonexistent. Parental authority was likewise rejected and castigated as a "capitalist survival," and the family was sentenced to "wither away" along with the school and the state.[45] This stage of educational chaos, later described in Soviet pronouncements as a period which exposed "the impotence of the educational theories of pseudoreformers," [46] finally came to a close with the turn of the decade.

The reorientation of Soviet educational policy at the end of the 1920's was not the result of a more sober approach by Soviet pedagogues; it was imposed by Stalin and the party as a consequence of the decision to launch industrialization under the First Five-Year Plan. In July 1928 a resolution of the party Central Committee called for action to step up the training of specialists for all levels of industry, in terms of both numbers and quality. Industry required new labor, and a strengthening of "polytechnical education" was held essential to meet this need. Thus, the start of the industrialization program provided the stimulus for a definitive leap into labor-oriented "polytechnization," which paradoxically signalled the first step toward the emasculation and abandonment of "polytechnism" in the Marxian sense.

To meet the exigencies of industrialization,

[42] See V. Protsko, "Gody iskanii" (Years of Search), *Narodnoe obrazovanie*, No. 11, Nov. 1957, pp. 113–117, for an interesting revival of interest in Shatskii's activities.

[43] See Z. I. Ravkin, *Sovetskaia shkola v period vosstanovleniia narodnogo khoziaistva, 1921–1925* (The Soviet School in the Period of Reconstruction of the National Economy), Moscow, 1959, especially pp. 188–190.

[44] *APS—NarObr—1957*, p. 42. This program described study areas of human knowledge in their relationship to the revolutionary transformation of the world and were based on the principle of learning through active participation. For an extensive discussion, see also Ravkin, *op. cit., passim.*

[45] For an interesting recent interpretation of this stage of Soviet education, see F. M. Hechinger, *The Big Red Schoolhouse*, New York: Doubleday, 1959. He is inclined to believe, quite reasonably, that in order to consolidate its power and authority, communist dictatorship had to undertake a massive destruction of the prevailing social order, including all educational institutions. This is, in effect, what was accomplished during the first phase of Soviet educational development, whether by folly or deliberate intent.

[46] *APS–NarObr—1957*, p. 44.

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the whole elementary and secondary school structure—and not merely its upper levels as had been originally contemplated—was given over to vocational training under the slogan, "The school is nothing but a branch of the factory." Practical and applied types of instruction dominated the school curriculum as education went "polytechnical" according to the new definition of this term. The majority of secondary schools were transformed into technical and vocational schools to meet the immediate demand for skilled industrial labor.[47] Narrow vocational training (monotechnism) emerged as the goal of polytechnical education.

2. *The Second Phase: The Retreat from Polytechnism toward Traditional Academic Education*

Before long, the drastic decline of academic scholarship which resulted from the wholesale harnessing of education to the training of skilled labor had a sobering effect. In August 1930 Lenin's widow, N. K. Krupskaia, opened the First All-Union Congress on Polytechnical Education, which had been convened to discuss the application of polytechnical education to the training of skilled and technical labor for various branches of Soviet industry and agriculture.[48] The conference discussions duly emphasized the link between school and factory and favored having the factories take direct charge of schools in order to shape their instructional programs in the desired way. At the same time, there were many criticisms of the unsatisfactory state of education. Meanwhile, in July-August 1930, the government decreed the introduction of universal elementary (4-year) education. But the quality of education continued to decline, and in 1931 the dam burst. In September 1931 the Central Committee of the Communist Party declared:

> The fundamental shortcoming of the school is that it does not provide a sufficient amount of general education and handles unsatisfactorily the task of preparing fully literate persons for technicums and higher educational establishments, persons who have acquired the fundamentals of knowledge (physics, chemistry, mathematics, languages, geography, etc.). Because of this, polytechnical education in many instances acquires a formalistic character and does not prepare builders of socialism with a many-sided education, who can combine theory with practice and who have mastered technology.[49]

The same resolution directed that polytechnization and the amalgamation of education and productive labor should be carried out in such a way that "all socially productive labor performed by students is directly subordinated to study and the educational objectives of the school." [50] Later in 1931 the People's Commissariat of Education and thereafter the Communist Party Central Committee and the Soviet Government issued a series of decrees which put an end to all the earlier extreme experimental projects in Soviet education. Soviet educators, armed with party and government policy pronouncements, proceeded to shape the new concept of polytechnical education. From that time until the late 1950's, polytechnical education was construed to mean the firm acquisition of applied knowledge and learning of the natural sciences, physics, chemistry, and mathematics.

The reaction against innovation was evident in other aspects of Soviet schooling as well. Soviet education went back to the time-tested traditional methods of instruction. Emphasis was again placed upon discipline and obedience, individual learning and grading, and the mastery of basic academic knowledge. Directed study and training once more took precedence over haphazard observation of environmental facts. Social and political participation were pushed into the realm of extracurricular activity; student interference with teaching was drastically curtailed; and the authority of the teacher was restored. The family was again considered a useful element of socialist society, and parents were called upon to aid the school.[51]

The turn toward conservatism in the early

[47] Interesting observations on this process may be found in R. Widmayer, *The Communist Party and the Soviet Schools, 1917–1937*, unpubl. Ph.D. thesis, Radcliffe College, 1952. See also Counts, *The Challenge of Soviet Education*, pp. 60–68.

[48] A. Bubnov, *Bor'ba za politekhnicheskuiu shkolu—bor'ba za sotsializm* (Struggle for the Polytechnical School—Struggle for Socialism), Moscow, 1931; and S. Klimov, *Vseobshchee obuchenie i politekhnizatsiia sel'skoi shkoly* (Universal Education and Polytechnization of Agricultural Schools), Moscow, 1931.

[49] Deineko, *Spravochnik*, p. 18.

[50] *Ibid.*, p. 20.

[51] A governmental decree or regulation of the Commissariat (Ministry) of Education was issued to enforce each and every one of these changes. (*Ibid., passim.*)

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1930's is attributed by some observers to the steady consolidation of power in the hands of Stalin, which tended to produce various adjustments to the new authoritarian pattern. The state demanded technically educated but obedient individuals, and the educational system was revised to produce them. The change is also viewed as a by-product of an overall adjustment in ideological and doctrinaire orientation reflecting the restoration of traditional symbols of authority and foreshadowing the emergence of inequality in Soviet society. All of these interpretations have merit, each in its own way.

It is apparent, nevertheless, that the most important motivating factor was the pressing need for an educational system capable of producing the kind of young people required by the emergent industrial society—young people with training in science and technology and with habits of disciplined obedience. The series of educational decrees issued in 1931 embodied these aims and redefined Soviet elementary and secondary education as general education with stress on literacy, general knowledge, and especially basic scientific knowledge.

The new policy was implemented by various specific decrees and directives between 1931 and 1934. These dealt, for example, with the establishment of regular class instruction, home assignments, required attendance, regular composition of class contingents, individual grading, restoration of the authority of teachers, elevation of scholastic performance standards, and reinforcement of discipline. In 1934, examinations covering the general program of study in secondary schools were introduced for those seeking admission to certain higher educational establishments. These examinations replaced those which had been in use since 1926, and which were little more than tests of literacy and "political understanding." The entrance examination requirements were made uniformly applicable to all higher educational establishments in 1936. Thereafter, until recently, upper-grade instruction in secondary schools was regarded primarily as preparatory to higher education.

The establishment of this new pattern marked the beginning of a prolonged period in which polytechnical instruction ceased to be actively discussed. The majority of the experimental pedagogues of the 1920's were purged or silenced in the "pedology" purge of 1936.

It is important to note at this point that the decree concerning pedological distortion has particular relevance now that polytechnization is again in vogue. The 1936 decree condemning pedology banned testing programs and techniques, student placement tests, etc. Vocational aptitude tests and statistical evaluation of test results were also banned. Now the Academy of Pedagogical Sciences of the RSFSR is again being asked to devise various methods for vocational guidance and testing, which all goes against the original decree on pedological distortions. There are no indications as yet how this vexing problem is to be solved.

From 1936 until the 1950's, the orthodox interpretation of Lenin's educational principle of the "unity of theory and practice" prevailed: that is, classroom instruction in the fundamentals of science came first, supplemented by the "practical application of science in the formation of work habits." [52] Until 1952 there seems to have been unanimous contempt for what was called naked technicism or applied vocational training without theoretical foundation. It was not the task of general education schools to provide vocational and specialized training, and these undertakings were delegated to *separate* educational institutions (vocational, trade and semiprofessional schools). The policy of instruction—fundamentals first, application thereafter—has carried over into the present third stage, but the drastic reorganization of Soviet schooling under the current educational reforms has resulted in the injection of labor polytechnical and vocational types of training into even the general education schools.

3. *The Third Phase: The Second Intrusion of Polytechnism—Academic Education with Productive Labor Training*

From the late 1930's until 1952 there was little mention of polytechnical education in Soviet

[52] M. N. Skatkin, *O politekhnicheskom obrazovanii v obshcheobrazovatel'noi shkole* (Concerning Polytechnical Education in Secondary Schools for General Education), Moscow, 1953, p. 13. Of course many other articles on this subject have appeared recently, but this particular reference is cited because its author is a member of the Research Institute on Methods of Instruction of the Academy of Pedagogical Sciences of the RSFSR.

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pedagogical literature. The abolition of workshop activities in Soviet schools in 1937 and the wholesale indictment of the People's Commissariats (Ministries) of Education for their failure to find an adequate substitute for "self-defeating vocationalism" put the brakes on loose talk about polytechnism.[53] But there was still talk about the need for practical training in secondary schools, and several educational conferences were held to study the problem. Also, right after World War II, there was a brief but abortive attempt to revive the ideas of polytechnical education as such.[54] Except for this, however, references to polytechnism were generally rare until 1952, when Stalin's *Economic Problems of Socialism in the U.S.S.R.* was published.

In this last work before his death, Stalin wrote that one of the three major conditions necessary for the transition from socialism to communism was an overall raising of the cultural level of the people so that "all members of society may have a many-sided education for their full physical and mental development and all members will obtain enough education to become active participants in social development and to be able freely to choose their occupations and not be chained for the rest of their lives to one occupation because of the existing division of labor." [55] This statement gave the signal for the second invasion of polytechnism into Soviet education.

In 1952 Malenkov declared at the 19th Party Congress that "in order to improve the socio-educational role of the general school and to permit students who graduate from it a free choice of occupation, polytechnical instruction should begin in secondary schools and all required measures should be taken for the transition to *universal polytechnical education.*" [56] This declaration was subsequently incorporated into the directives of the Fifth Five-Year Plan (1951–55). The full meaning of Malenkov's pronouncement emerges only when it is viewed in the light of the concurrent claim that universal 7-year education had already been achieved, that universal 10-year education was to be achieved in all major urban localities by 1955, and that by 1960 the 10-year school was to be universal in rural areas as well. It is obvious that the reintroduction of polytechnism into Soviet schools was a *planning decision* of the political leadership and that educators were not even consulted. It was only *after* these declarations that debate on the content and the meaning of polytechnical education began reappearing in Soviet pedagogical organs.

At first glance, the new drive to introduce polytechnical education in primary and secondary schools did not seem to challenge the principle that practical instruction should *supplement* theory taught in regular classes by traditional and conservative instruction methods.[57] In fact, some passages in the directive on methodology issued by the Ministry of Education of the RSFSR in August 1953 (concerning polytechnical instruction) drew upon the decree of September 1931, which explicitly warned against "perversions of the idea of polytechnical education" by separating and minimizing the "systematic and firm study of sciences." [58] The 1953 directive was emphatic:

> Polytechnical education in secondary schools should be of such a type as (1) to acquaint the students, in the process of studying the fundamentals of science, with its application in industry and agriculture . . . (2) to acquaint the students with the elements of production technology . . . (3) to offer some skill education which may be useful in future productive activity . . . (4) to create a link between socially useful labor and the school by subordinating all laboring activity of the school to the study-educational objectives of the school.[59]

The directive also reemphasized that the "basic precondition for successful polytechnical education is the mastery of instruction subjects. Of particular importance among these are physics, chemistry, biology, geography, mathematics and technical drafting." [60] It further enumerated various polytechnical activities to be conducted by the schools in various standard subjects of instruction.[61] These developments highlighted

[53] *Pravda*, May 13, 1939.
[54] There are several dozen articles in *Uchitel'skaia gazeta* and *Trud* in 1945, 1946 and 1947. Also see L. Skatkin's article in *Sovetskaia pedagogika*, No. 8, 1946; and two articles by S. Shabanov in *Sovetskaia pedagogika*, Nos. 5–6; No. 8, 1945.
[55] Stalin, *Ekonomicheskie problemy sotsializma v SSSR*, p. 68.
[56] Deineko, *Spravochnik*, p. 186. (Emphasis added.)
[57] M. N. Skatkin, *op. cit.*, *passim*.
[58] Deineko, *Spravochnik*, p. 187.
[59] *Ibid.*, p. 188.
[60] *Idem*.
[61] *Ibid.*, pp. 189–190. In this connection, see also Korol, *Soviet Education*, pp. 29–30.

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the first stage of the new polytechnical invasion, which was to go on until about 1955.

The chief features of this stage were that the school curriculum was adjusted only moderately, that polytechnical instruction was viewed as a tool for learning other academic subjects and as a testing ground for their application.[62] Some schools had workshops and laboratory facilities in which students were required to work, but on the whole, since there was still a lack of sufficient laboratory space, physical equipment and other aids in the schools themselves, students were taken out on frequent excursions to factories, power stations, fields and forests. There they were shown the operation of mechanical equipment, or technological processes were explained to them. In the rural areas, planting, growing, animal breeding techniques were demonstrated or explained to the students. The processes of nature were also observed. In addition, students were assigned problems either worded in technical language or adapted directly from technical practice. They were instructed to prepare various drawings and charts. Whenever facilities were available, the students were urged to participate in various clubs (*kruzhki*), such as amateur radio, electrotechnical and aircraft modeling groups. These frequently time-consuming undertakings were evidently carried on in addition to regular classwork. This type of instruction was not, strictly speaking, what was originally meant by polytechnical instruction, but even in modified form it served a definite purpose. On the one hand, it stimulated the student's curiosity about applied technical fields, and on the other, it satisfied his curiosity, to some extent, by providing some practical answers.

In this connection, it is important to bear in mind that the influx of students into grades 8–10 during this period (1952–56) (see later discussion of enrollment trends) meant that the Soviet teacher was faced with a relatively less able group of students who probably were not as interested, as well prepared, or as capable of mastering the traditional curriculum as their predecessors, since the process of selecting students had been significantly relaxed. As a result, instruction had to be modified and supplemented with practical examples and applications to hold the student's interest.

Apparently this halfway application of polytechnical principles was considered insufficient. From 1952 on, when the Soviet authorities announced their ambitious plans to make secondary education universal, they began to stress that higher education would no longer be available to all secondary school graduates, and that consequently the senior secondary grades (8–10), instead of aiming primarily at the preparation of candidates for higher education, would revise their instruction so as to prepare youth for "practical activity and freedom in the selection of occupation." This clearly implied that the limited kind of polytechnical education offered during 1952–55 was inadequate for the purpose of equipping students for "practical activity," i.e., for employment in industry or elsewhere.

At the 20th Party Congress in February 1956, it was Khrushchev's turn to denounce the failure of the polytechnical instruction program. He declared that the program was proceeding "too slowly," that educators and the "Academy of Pedagogical Sciences merely engage in general talk about the usefulness of polytechnical education but in reality do not do anything to achieve it." [63] What was needed, he said, was "to reshape radically the instruction programs of the secondary schools in the direction of greater production specialization," which would not only permit graduates to enter higher education, but also "prepare them for practical activity" so that they could "enter direct employment in various branches of the national economy."

These proposals closely followed Stalin's 1952 pronouncements calling for the diversification of applied schooling as to allow greater individual choice of occupation. It should be noted also that they were made in conjunction with the proposal to effect universal 10-year education by 1960. Khrushchev, however, placed emphasis upon one specific aspect of polytechnical education among the several which had been envisaged in the past: namely, "*production specialization of instruction*" in secondary schools for the explicit purpose of preparing

[62] M. N. Skatkin, *Politekhnicheskoe obuchenie na sovremennom etape razvitiia shkoly* (Polytechnical Education in the Present Stage of School Development), Moscow, 1956, especially pp. 4–13.

[63] *Pravda*, Feb. 15, 1956.

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graduates for immediate employment. In so doing, he clearly departed from Marxist and Leninist concepts of the function of polytechnical education, but he nevertheless called his proposals a move toward the restoration of Leninist principles of education. Actually, what he advocated was tantamount to a revival of narrow monotechnism and straight vocationalism.

Khrushchev's version of polytechnization was probably inspired by the actual state of polytechnical training in the schools in the year or two preceding his 1956 proposals. The schools still lacked necessary polytechnical training facilities—workshops, equipment, laboratories, tools, materials [64]—and the teachers themselves were not familiar with the various paraphernalia of polytechnical education.[65] (Teachers lacking experience frequently shied away from polytechnical instruction assignments.) Proper polytechnical instruction is an expensive undertaking, yet one which frequently does not produce commensurate results. Verbal instruction, textbook learning, classroom explanations are undoubtedly much cheaper and frequently more effective ways of instruction. Unable to secure the necessary resources, facilities, and qualified teaching staff to conduct effective polytechnical training on their own, the schools were obliged to rely upon the cooperation of industrial enterprises. The latter were required by party directives to give such cooperation, for which they would be compensated by being able to obtain labor recruits later from among the students trained in their plants and therefore having the particular skills required by them.

These considerations were in evidence almost two years before the 20th Congress. For example, during the 1954–55 academic year, the Communist Party Central Committee and Council of Ministers of the Ukrainian SSR ordered the establishment, on an "experimental basis," of 26 "specialized study groups" composed of students in the upper secondary grades of local schools.[66] These groups were to engage in a program of instruction which would entitle those completing it not only to the regular 10-year school graduation certificate (*attestat zrelosti*), but also to a "work qualification certificate" (*udostoverenie o rabochei kvalifikatsii*). The latter certificate gave its holder an intermediate work qualification rating, ie., 3d to 5th grade, according to the standard scale for skilled jobs. The experimental program extended the normal 3-year period of upper secondary schooling to 4 years to permit students to spend one or two days a week learning a skill—such as lathe operator, metal worker, seamstress—directly at the enterprise which had been placed in charge of a particular "specialized study group." (A similar system of plants taking charge of skill instruction in schools was also in existence in the 1920's and early 1930's.) The experiment proved so "successful" that one year after the program had been initiated in six schools, "specialized study groups" were in operation in 205 schools in the Ukraine, and in 1957–58 the number increased to 3,452.[67] Each school usually offered one specialty profile, but sometimes two or three. Other republics followed suit in 1955 and 1956.[68] Thus, "production specialization" was already in existence in upper secondary education by the time the educational reform program was enacted in 1958.[69]

A noteworthy feature of this development was the indiscriminate extension of supposedly "polytechnical" training to cover whatever type of work activity happened to be needed or available in the particular locality. For example, on-the-job training for polytechnical students might include work in construction projects and school building repair; [70] or working as auxiliary helpers (floor-sweepers) in a production enterprise; [71] and ordinary fieldhand's work as members of "agricultural work brigades for students." [72] Students from urban areas, sent to

[64] There have been frequent and continuing reports attesting to the lack of facilities and equipment. E.g., for Kirgizia, see *Sovetskaia Kirgiziia*, Aug. 31, 1956; July 25, 1957; July 2, 1958; Aug. 9, 1958; for other areas, *Sovetskaia Estonia*, May 12, 1956, and *Kommunist Tadzhikistana*, June 2, 1956.

[65] *Sovetskaia Rossiia*, Jan. 17, 1958.

[66] *Narodnoe obrazovanie*, No. 5, May 1956, pp. 34–38.

[67] *Kommunist* (journal: U.S.S.R.), No. 5, Apr. 1958, p. 120.

[68] *Kommunist* (newspaper: Armenia), Mar. 31, Oct. 13, 1956; *Kommunist Tadzhikistana*, June 2, 1956; *Sovetskaia Belorussia*, Nov. 22, 1956; *Zaria vostoka*, Feb. 12, Sept. 1, 1957.

[69] *Sovetskaia Rossiia*, Feb. 5, 1958; *Pravda vostoka*, June 11, 1958, *Turkmenskaia iskra*, Jan. 11, 1958; *Kommunist Tadzhikistana*, Oct. 18, 1957.

[70] *Sovetskaia Kirgiziia*, Aug. 30, 1959; *Sovetskaia Rossiia*, July 22, 1959.

[71] *Sovetskaia Moldavia*, Sept. 18, 1958.

[72] There was a "special session" of the Academy of Pedagogical Sciences in Krasnodar (Northern Caucasus) in August 1956, which endorsed this polytechnical practice (*Sovetskaia Litva*, Dec. 8, 1956). See also the discussion in *APS–NarObr–1957*, p. 142. The 1958 version of the same thing is written up in *Sovetskaia Kirgiziia*, Apr. 25, 1958.

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the country to get "polytechnical experience" in agriculture, were assigned to "labor camps" (*trudovye lageri*), from which they were detailed to agricultural work brigades.[73] Particular types of "work activity" classified as polytechnical training were sometimes divided into categories by grade and type, ranging all the way from bookbinding in a school library workshop to taking care of livestock on a collective farm.[74]

These tendencies in the practical application of polytechnical education emerged before the educational reform campaign got underway in the spring of 1958. Polytechnical work training, however, was still considered "supplemental" to academic education, and it was emphatically stated that the "acquisition of work habits is impossible without the mastery of basic knowledge" [75] (gained through the regular school courses of instruction). The original plan for an 11- or 12-year school, proposed by the RSFSR Academy of Pedagogical Sciences, was based on this assumption.[76] But when Khrushchev initiated the 1958 drive for educational reform, he sidestepped the central issue of what polytechnical education is, and what it should do for the individual. As pointed out in chapter I, Khrushchev's speech to the Komsomol Congress in April 1958 did not once mention the concept of polytechnical education, and his later memorandum outlining the program of school reform contained only two references to it,[77] once in conjunction with the type of education to be offered in the proposed 8-year school and once in conjunction with the retention of "some" secondary schools. Both references, however, implied the notion of practical labor training.

Khrushchev's slighting of polytechnical education could hardly have been accidental. If his ideas for the reform of the school system were to be realized, it was essential to discredit the concept of polytechnical education as understood by Soviet educators. He therefore ignored it and placed full emphasis upon "physical labor," "productive labor," and the necessity of reforming the existing school system so as to prepare youth mentally, physically, and psychologically for the performance of useful labor tasks, thereby establishing a "link between the school and life." Some Western observers have seen an affinity between Khrushchev's idea of a closer tie between education and "life" and Western liberal educational ideals of "life adjustment"; but in spite of this superficial similarity in terms, the two concepts are at opposite poles. Moreover, despite Khrushchev's claim that emphasizing labor preparation in the school is in full accord with both Marxist doctrine and Lenin's ideas of combining education with productive labor, the fact is that neither Marx nor Lenin ever envisaged the "productive specialization of the school" as meaning simply that the whole purpose of education was to equip students with "useful vocational skills."

In the later documents on educational reform [78] (i.e., the theses of the CPSU Central Committee and the U.S.S.R. Council of Ministers, and the school reform act itself), numerous references to polytechnical instruction began to appear. These references, however, were invariably coupled with such words as "labor," "labor activity," and "socially useful labor," and the intrinsic content of education as envisaged in the reform proposals will be one-sided, specifically vocational labor training superimposed upon the traditionally-oriented regular school curriculum—in short, monotechnism rather than polytechnism. Whatever polytechnical training and general grounding in practical arts are to be given to Soviet pupils now will be given in the first 8 years of school, a sufficient tribute, in the eyes of Soviet authorities, to polytechnism. As far as the grades beyond 8 are concerned, however, there is to be only one-sided vocational training. This will be of a single type for the individual or for whatever group to which he is assigned depending upon the availability of local resources and the current demand of local economic units for a given type of labor. Thus, the "choice" of vocational training or choice of future occupation will be circumscribed by local conditions. Each trade will be taught to a separate group of stu-

[73] *Sovetskaia Latvia*, May 11, 1958; *Sovetskaia Moldavia*, Aug. 30, 1958.
[74] *Narodnoe obrazovanie*, No. 8, Aug. 1956, pp. 53–64.
[75] *Pravda*, Aug. 24, 1957.
[76] For a discussion of Academy proposals, see ch. I; for a discussion of the proposed curriculum, ch. II, below.
[77] *Pravda*, Sept. 21, 1958. The references appear on p. 2, col. 3, fifth paragraph from the bottom, and col. 6, seventh paragraph from the top.
[78] *Ibid.*, Nov. 16, Dec. 25, 1958.

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dents. Each student must choose only one profile trade specialization in the new "labor polytechnical school with production training." Toward this goal, the educational targets of the current Seven-Year Plan include the reorganization of the upper grades (8–10) of the former 10-year school into a network of "labor schools" (*trudovye shkoly*) which, in addition to general and polytechnical education, will offer "specialized training in common vocational occupations depending upon the local demand for cadres." [79]

4. *Present Problems and Prospects of Polytechnical Education*

As pointed out above, "polytechnical" or "applied" education in the present Soviet context covers a wide variety of types of training ranging from instruction in wood and metal crafts in school workshops to potato and corn planting and raising chickens and rabbits. All these activities are viewed as socially useful labor and are regarded as part of the polytechnical education program. Under the new curriculum and school program (see discussion below), "labor education" (*trudovoe obuchenie*) [80] will begin in the elementary grades with the following activities: (1) self-service (i.e., maintenance and household chores—sweeping classrooms, sewing, housecleaning, and washing dishes); (2) outdoor and agricultural activity (planting flowers, raising rabbits, and fieldwork); (3) work with paper and cardboard (preparation of various toys, models, etc.); (4) work with clay (making pottery, models, etc.); and (5) technical modeling (use of miniature structural assembly sets to build various models of tools and machines). These activities will take up 432 hours of instruction, or about 12 percent of the curriculum. (See appendix table II–B–5.)

In the intermediate grades (5–8), "labor training" will be carried on in school workshops, practice farming plots, and "home science" classes for girls.[81] In addition, students will spend 2 hours a week, plus a 2-week period at the end of the school year, performing obligatory "socially useful work." Training will include woodworking and metalworking, sewing and cooking; and "socially useful work" will take in streetsweeping and yard cleaning, collections of scrap metal, paper, and rags, and cleaning jobs around the school. The new school curriculum, it may be noted, thus includes subjects which have occasionally been criticized as "frills" in the United States—such as home economics (cooking, sewing, and household "hygiene") and "family recreational activity," which has been called "one of the very important school subjects." [82] Instruction in the subjects mentioned above will be both "theoretical" and applied. An aggregate of 429 hours, or 10 percent of total instruction time, will be devoted to these subjects in grades 5–8, not counting the required periods of supplementary "socially useful work" and summer practice.

Finally, in the upper secondary grades (9–11), students will receive "vocational specialty" training in plants and factories, on construction projects and collective farms. This training will take up one-third of total instruction time—two full days per week—and will be thoroughly subordinated to economic planning requirements rather than educational considerations. In fact, according to *Pravda*, the school administrations will operate in this area in accordance with directives of the economic planning organs: the latter will prescribe "where, in what skills, and in what numbers it is deemed desirable to prepare school youths of the upper grades . . . ," depending "upon the demands of the regional economic councils for given types of labor and upon employment opportunities for the graduates." [83] Thus, said the same newspaper, the new system of "production education" will assure "that all new branches of industry are fully provided with qualified young workers." [84] The schools will be required to train truck-drivers, mechanics, lathe operators, tool and die makers, seamstresses, coal miners, cooks, candy-makers, and hundreds of other kinds of specialized workers—in short, whatever types of labor may be required in a given economic region.

Under the current school reforms, then, the

[79] *Ibid.*, Feb. 8, 1959.
[80] MP RSFSR, Akademiia Pedagogicheskikh Nauk RSFSR, *Shkol'nye programmy: nachal'nykh klassov vosmiletnei shkoly na 1959–60 uchebnyi god* (School Programs: Elementary Grades of the 8-year School for the Academic Year 1959–60), Moscow, 1959, pp. 104–128.
[81] *Komsomol'skaia pravda*, Aug. 30, 1959 (new study plans).
[82] *Pravda*, Oct. 21, 1959.
[83] Dec. 4, 1959.
[84] Nov. 13, 1959.

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school teacher remains the chief instrumentality of the educational process through the elementary and intermediate (junior secondary) grades, but in the upper grades (9–11) a large share of responsibility for the student's skill training is transferred to local industry. This specific skill training is supplemental to the academic subjects of instruction still required, and carried out, as in the past, by the teacher in the traditional classroom setting.

The 1959 reorganization of teacher education makes allowance for training of "combination" teachers, who will aid the instruction program in skill subjects in the future. Meanwhile, the Soviet press has been urging that "the most experienced engineers, technicians and skilled workers be assigned to conduct vocational instruction." [85] These exhortations serve to underline one of the difficult problems facing the Soviet effort to step up practical production training—i.e., the problem of supplying competent teachers.[86]

Past experience has demonstrated that ordinary production workers, who usually were assigned as instructors hitherto, were incapable of doing a competent job.[87] They were unable to explain industrial processes and could demonstrate only the specific production skill which they themselves were familiar with, with the result that production fundamentals were taught only superficially and the students' training was largely confined to on-the-job training in a given skill.[88] At the same time, the number of specially trained vocational teachers has been extremely small, and at current rates of training, it would take 15 years to develop the number of qualified teachers required by the present program.[89] The obligation to provide instructors also imposes a burden on the industrial enterprises supervising the training programs. If an experienced production foreman or highly skilled worker is taken off his job to serve as a fulltime vocational instructor, he tends to lose his job skill within a few years.[90] Moreover, many highly skilled workers themselves try to avoid assignment as instructors. The difficulty in getting qualified vocational teachers also stems from the reluctance of managers to release their most highly skilled workers for teaching duties and the reluctance of such workers themselves to take on teaching duties, which almost certainly pay less than they could earn in the same amount of time at their machines. In order to resolve this problem, it has been advocated that plants assign experienced personnel as instructors, but only on a part-time basis.

A second problem is that of physical facilities. Upper secondary students who receive on-the-job training 2 or 3 days a week in industrial enterprises are often assigned to special training shops operating only on a day shift.[91] This segregation of instructional activity from regular production has come about largely as a concession to the contention of plant managers that allowing inexperienced and "irresponsible" youngsters to handle regular production equipment would cause breakdowns and disrupt production schedules, resulting in nonfulfillment of production targets. In fact, there have been many reported cases of plants refusing to permit vocational trainees to use their equipment for fear of breakdowns or simply because "there was not enough equipment to go around." [92] As a result, students in some plants have done little but stand by and watch.[93] This points up the difficulties of integrating vocational training at the secondary school level from the point of view of management.

It is evident from these reports that steps to vocationalize upper secondary education in the U.S.S.R. are still short of their objectives, in spite of the efforts which the regime has made to resolve the problems just described. In 1956, for example, the trade unions were ordered to support the drive for polytechnical education by organizing special clubs and seeing that industrial enterprises provided instructors and made available plant equipment not needed in actual production to the schools for polytechnical training purposes.[94] But despite press reports that industrial enterprises were "doing

[85] *Pravda*, Aug. 14, 1959.
[86] This has been a perennial problem in the area of vocational training; see earlier discussion and also *Sovetskaia Litva*, Nov. 28, 1956.
[87] *Sovetskaia Moldavia*, Aug. 29, 1958.
[88] *Sovetskaia Kirgiziia*, Aug. 28, 1958.
[89] *Sovetskaia Rossiia*, Jan. 17, 1958.
[90] *Sovetskaia Moldavia*, Dec. 11, 1958.
[91] *Pravda*, Aug. 26, Nov. 13, 1959.
[92] See a story to this effect in *Kommunist* (newspaper: Armenia), May 30, 1959.
[93] *Sovetskaia Rossiia*, Jan. 4, 1958.
[94] Malin, *op. cit.*, p. 504.

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their utmost to provide the schools with machinery and equipment," [95] it is apparent that many of them have simply had no equipment to spare.

Another problem posed by the greatly increased emphasis on vocational training is the effect which this will have on standards of regular academic education. Even prior to the 1958 reforms, when vocational training in the upper secondary grades was not compulsory, there were frequent complaints that the tendency toward "narrow vocational specialization" was having a detrimental effect on the teaching of general academic subjects.[96] Teaching manuals used in vocational courses in 1958 provide concrete evidence of this tendency and show that vocational training actually was far from conforming even to the prevailing Soviet concepts of polytechnical education, which postulated balanced instruction in theory and its practical application.[97] In the postreform school curriculum, vocational training is to be compulsory instead of optional, and the tendency toward narrow specialization will be strengthened. Students will be able to "elect" one of several specific types of vocational training, but beyond that they will have no freedom of choice.

Recent reports in the Soviet press have already pointed to a significant deterioration in the academic preparation of students attending experimental secondary schools with specialized vocational training, especially in the rural areas. The deterioration is attributed to poorly organized academic instruction and excessively heavy labor training and practice work schedules. The dilemma in the future will therefore be how to maintain the program of universal vocational training and still preserve academic standards for at least the more gifted students.

It is also apparent from comments which have recently appeared in the Soviet press that many students have not reacted favorably to the blanket requirement for vocational training in the upper grades of the secondary school. In order to stimulate a more enthusiastic response, some newspaper articles have suggested that the students be paid for their hours of on-the-job work training, thus providing an incentive.[98] The educational reform law, it should be noted, authorizes paying students of vocational-technical schools for the hours they work in training shops, but it makes no such provision for secondary school students.

Adult Education and Alternative Equivalents to Secondary General Education and Their Integration into the Regular School Structure

One of the cardinal features of the Soviet educational reform program is the greatly enhanced role allotted to various forms of part-time education as substitutes for regular secondary schooling. These "alternative equivalents" to regular schooling, as pointed out earlier, have long been part of the Soviet educational system. Formerly, however, they were intended primarily for adults who had been unable to complete regular secondary school and desired to qualify themselves for admission to higher education. Their application will be much broader in the postreform educational setup.

Shortly after the 1917 Revolution, when all levels of education were declared free and accessible to all, the adult education program was initiated as a means of quickly preparing workers with inadequate secondary schooling for entry into higher education. The so-called "workers' faculties" (*rabfak*) were the chief instrumentality of the program. However, in some cases the workers' previous education was inadequate even to qualify them for study in these facilities, and the Soviet Government consequently established "courses of advanced level" (*kursy povyshennogo tipa*) or "schools of advanced level" (*shkoly povyshennogo tipa*), designed to provide adults with education equivalent to the upper grades of what were then called the first-level school (i.e., grades 5–7) or second-level school (i.e., grades 8–9). These schools and courses for adults were "advanced"

[95] *Pravda*, Aug. 6, 1958.

[96] *Bakinskii rabochii*, Jan. 16, 1957; *Pravda vostoka*, Feb. 12, 1957.

[97] E.g., see the following manuals used in Ukrainian schools: A. O. Pivovarov, *Praktykum z mashynozavstva dlia 8-klassu* (Machine-Building Practice in the 8th Grade), Kiev, 1958; M. T. Bova, *Osnovy radiotekhniky* (Principles of Radio Technique), Kiev, 1958; *Tokarna sprava dlia serednii shkoly* (Lathe-operating Practice in the Secondary School), Kiev, 1958.

[98] *Sovetskaia Kirgiziia*, Jan. 7, 1959.

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only in the sense that they were on a higher level than elementary school. In 1922 there were some 700 such courses or schools with about 44,000 students enrolled,[99] some of the "graduates" going on to attend the *rabfak* preparatory to seeking university education. Instruction in these schools was usually given in the evening, using regular school buildings and teachers.

With the reorganization of the regular schools in the early 1930's, adult education facilities also were modified along corresponding lines, resulting in the creation of 7-year and 10-year schools for adults.[1] Between 60 and 65 percent of the students in these schools were enrolled in the intermediate grades (5–7), 20 to 25 percent in the upper grades (8–10), and 10 to 15 percent in the elementary grades (4th and lower). The total enrollment in these schools, originally called "schools of advanced level" but subsequently designated as 7- and 10-year schools for adults, in selected prewar years was as follows: [2]

1922	44,000	1936	391,000
1930	277,000	1938	751,000
1932	*(none)	1939	736,000
1934	206,000	1940	744,000

* During the period 1931–33 separate schools for adults were abolished and designated as "courses." Some of the upper-grade adult students were transferred to *rabfak*.

In 1940, 203,000, or about 27 percent of the total adult school enrollment, were in grades 8-10, representing the highest prewar number, as well as ratio, of adults enrolled in the top grades.

The *rabfak*, first established in 1919 for the benefit of "deserving" workers and persons of proletarian origin, were originally set up as divisions (*fakul'tety*) of a special "workers' university," but shortly thereafter were changed into pre-university preparatory schools offering 2- to 4-year programs of study for adults. Total enrollment in these "workers' faculties" in selected prewar years was as follows: [3]

1922	38,000	1933	271,000
1928	57,000	1936	197,000
1930	155,000	1938	108,000
1932	339,000	1940	25,000

[99] See appendix table II–A–1.
[1] *APS–NarObr–1957*, p. 312.
[2] Appendix table II–A–1, col. Ca or col. Fa.
[3] *Ibid.*, col. G.

The *rabfak* thus attained their peak enrollment in 1932. In the 1920's and early 1930's, they performed a uniquely political as well as an educational function in that they were used to give speedy preparation for higher education to selected party activists with promising leadership qualifications. Many of the present Soviet political leaders, including Khrushchev, went through *rabfak* programs. However, the institution declined in importance after the mid-1930's when the first post-revolutionary generation of Soviet youth began graduating from the secondary grades of the regular schools, and the *rabfak* finally went out of existence shortly before the beginning of World War II.

During the first 2 years of Soviet participation in World War II, no general education facilities of any kind for adults were operative, although there was a significant stepup of industrial labor training. Meanwhile, many Soviet youths of age 12 and over were drafted out of the secondary school grades to fill wartime jobs in factories and on the farms, and in order to enable them to continue schooling on a part-time basis, the Soviet Government in July 1943 established the urban "schools for working youth" [4] and, one year later, the "schools for rural youth" in agricultural areas. These schools were supposedly a temporary wartime expedient but nevertheless continued to function and to expand their enrollments after the war. In 1945 they had a total enrollment of 683,000, which increased to 1,350,000 by 1950.[5] During the period 1946–50, the schools for working and rural youth were kept in operation primarily to provide education for those whose regular schooling had been interrupted by the war,[6] and the students were primarily in the 16–18 age group. In the early 1950's, however, there was a fresh influx of more mature adults,[7] and in 1952 the 19th CPSU Congress decided to make these schools permanent establishments offering part-time schooling to anyone who had not completed his regular secondary education.

In addition to the schools for working and

[4] MP RSFSR, Danev, *op. cit.*, pp. 247–265. It should be noted that these schools were called "schools for juvenile workers" (*shkoly rabochikh podrostkov*) until April 1944 when they were renamed as indicated. See also *APS–NarObr–1957*, pp. 313–315.
[5] See appendix table II–A–1, cols. D and E.
[6] *Pravda*, Mar. 22, 1946.
[7] *Komsomol'skaia pravda*, Aug. 3, 1958.

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rural youth, adult education schools proper—including both evening and extension-correspondence schools—were revived in 1945. The total enrollment in these schools in 1945 was 31,000 as against 744,000 before the war, in 1940.[8] In 1945 most part-time students were enrolled in schools for working (348,000) and rural (335,000) youth, and schools for adults became a minor component of part-time educational facilities. Thus the postwar expansion of part-time educational facilities, as evidenced by the enrollment figures cited above, has centered chiefly on the schools for working and rural youth and on the younger adult age group below 25.

Since 1955 there has been a revival of part-time courses preparatory for entry into higher education (see also ch. IV), especially since the introduction of the provision giving those who have already been gainfully employed preference in gaining admission to higher educational establishments. Such facilities are being expanded under the current program of educational reform. In 1959 even the name *rabfak* came back into use as the designation of 1-year voluntary refresher courses offered for secondary school graduates desiring to prepare for entrance examinations to higher educational institutions after a period of active employment.[9] The new *rabfak* also differs from its predecessor in that there is no rigorous preselection of applicants on social grounds and the course is not rated as equivalent to secondary education, but merely a refresher program for taking the entrance examinations for higher education.

Table II–4 presents comprehensive data on enrollments, overall and by grade level, in schools for working and for rural youth and adult education schools from 1950 through 1959. As indicated by the data in this table, the aggregate enrollment in schools for working youth has doubled over the last 10 years. Enrollment in schools for adults shows a steady rise over the decade, with almost twice as many students in 1959 as in 1950. Enrollment in schools for rural youth, however, has fluctuated during this period, with a notable decline in 1957 and 1958, and a marked rise in 1959 accountable particularly by the expansion of upper-grade (8–10) enrollment. In 1959 two-thirds of students in all three types of schools were enrolled in the upper grades. Most schools by

[8] Appendix table II–A–1, col. F.

[9] *Komsomol'skaia pravda*, Dec. 20, 1959 (article entitled "The *Rabfak* Opens its Doors").

TABLE II–4.—*Enrollment in Soviet schools for working and rural youth and schools for adults by type of school and level of grade, 1950–59*

[In thousands]

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Schools for working youth, total	838.3	1,001.8	1,126.3	1,352.9	1,416.6	1,387.1	1,471.8	1,508.0	1,509.6	1,727.7
By grades:										
1 to 4	85.6	91.6	80.5	79.0	72.8	54.0	43.9	33.8	38.5	52.5
5 to 7	460.4	527.1	558.8	628.1	589.9	533.9	535.3	457.7	450.3	552.7
8 to 10	292.3	383.1	487.0	645.8	753.9	799.2	892.6	998.5	1,020.8	1,122.5
Schools for rural youth, total	511.7	481.1	455.2	479.2	395.8	345.4	344.7	295.8	273.4	422.4
By grades:										
1 to 4	259.8	210.6	144.5	109.8	68.0	44.1	28.7	17.5	11.3	9.4
5 to 7	248.3	268.1	308.2	364.7	320.4	277.8	207.7	152.0	121.1	147.5
8 to 10	3.6	2.4	2.5	4.7	7.4	23.5	108.3	126.3	141.0	265.5
Schools for adults, total	87.9	101.8	108.7	117.1	120.6	120.5	124.7	126.9	133.3	167.5
By grades:										
1 to 4	6.8	8.0	7.9	8.2	5.9	4.7	.....	0.1	1.0	1.2
5 to 7	36.4	38.2	36.4	35.5	33.0	32.2	31.9	31.7	35.3	51.7
8 to 10	44.7	55.6	64.4	73.4	81.7	83.6	92.8	95.1	97.0	114.6

Sources: *KS–1956*, pp. 156–157; *Nar Khoz–1959*, p. 817; *NarKhoz–1960*, p. 732.

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TABLE II–5.—*Curriculum of schools for working youth, pre-1957*

Subjects	Instruction hours per week, by grade						Total instruction hours
	5	6	7	8	9	10	
Russian language and literature	4/5	4	3	3/2	2/3	2/3	726
Arithmetic	5/3	.....	.....	.....	.....	.....	148
Algebra, geometry, trigonometry	.....	4/3	3/0	3	3	4	625
Natural sciences	.....	0/3	3/0	0/2	0/2	.....	249
History	0/3	1/2	3/0	2/3	3/2	2/3	460
Constitution of the U.S.S.R.	.....	.....	0/2	.....	.....	.....	42
Geography	4/0	0/3	0/2	3/0	0/3	.....	287
Physics	.....	1/2	0/3	2	3/0	3/2	342
Astronomy	.....	.....	.....	.....	.....	1/0	17
Chemistry	.....	.....	2/1	0/2	1/2	2	232
Foreign language	3/2	2	1/2	2	2/1	2	435
Drafting	.....	1/0	1/0	1/0	2/0	.....	85
Total	16	16	16	16	16	16	3,648
Consultation periods	4	4	4	4	4	4	912

Numerator—spring term; denominator—fall term.

Source: *Medynskii–1952*, p. 119.

then offered instruction only in the intermediate and upper secondary grades, i.e., grades 5–10. Aggregate enrollment in all three types of schools—for working youth, for rural youth, and for adults—was 2.8 million in the fall of 1960.[9a] A total of 21,400 such schools were in operation.

Table II–5 presents the standard curriculum for schools for working youth in use from 1946 to 1957.

[9a] *SSSR–Tsif–1960*, p. 306.

The schools for working youth required 3 days' attendance per week, with the instruction schedule including 16 hours of classes and 4 hours of "consultation periods" weekly until 1958–59, when the hours of classroom instruction were increased to 18.[10] The curriculum

[10] This represents about half the instruction hours per week provided in the regular full-time schools. A comparison of aggregate instruction hours for all intermediate and upper-secondary grades (5 through 10) gives a total of about 3,600 hours in the schools for working youth as against 6,400 hours in regular schools.

TABLE II–6.—*Curriculum of evening, alternating-shift and seasonal schools, grades 3–8, 1959–60*

Subjects	Instruction hours per week, by grade							
	3	4	Total 3–4	5	6	7	8	Total 5–8
Russian language	10	10	20	5/4	4	2/3	2	13
Literature	.....	.....	.....	2/1	2	2/1	1	6
Mathematics	5	5	10	5/4	4/5	5/4	3/4	17
History	.....	.....	.....	1/2	2/1	2/1	2	6.5
Geography	.....	.....	.....	1/2	2/1	1/2	.....	4.5
Biology	.....	.....	.....	1/2	1/2	1	.....	4
Physics	.....	.....	.....	.....	.....	2/3	3/2	5
Chemistry	.....	.....	.....	.....	.....	.....	3/2	2.5
Technical drawing	.....	.....	.....	.....	.....	.....	1/2	1.5
Total	15	15	30	15	15	15	15	60
Elective subjects:								
(*a*) Foreign language	.....	.....	.....	2	2	2	2	8
(*b*) Training for improving professional qualifications	.....	.....	.....	1	1	1	1	4
Consultations	5	5	10	2	2	2	2	8
Total	20	20	40	20	20	20	20	80

Numerator—spring term; denominator—fall term.

Source: *Uchitel'skaia gazeta*, Aug. 29, 1959.

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covered the same subjects as the regular school curriculum at the same grade levels,[11] except that physical education and military training were omitted. However, a new curriculum which was introduced in the schools for working youth in 1958–59 considerably reduced the proportion of instruction time devoted to general education subjects (e.g., literature, history) and increased the time given to sciences (physics, mathematics) and vocational-technical subjects (e.g., drafting).[12] Special courses for the "improvement of skill qualifications" were also added to the curriculum for the first time, their purpose being to enable students either to perfect an existing vocational-technical skill used in their present jobs or to develop an additional related skill useful elsewhere in the same enterprise. These trends were further accentuated in the new curriculum for 1959–60.[13]

Tables II–6 and II–7 present the curricula of the newly established part-time secondary schools (evening, alternating-shift or seasonal), which replace the schools for working and rural youth. The range of subjects has remained about the same, but the number of instruction hours devoted to academic subjects has been reduced to 15 hours per week. In the upper grades, skill subjects have been added as an "elective." The total number of instruction hours devoted to academic subjects may be estimated as 1,900 for evening and alternating shift schools (36 instruction weeks per school year) and 1,150 for seasonal schools (26 instruction weeks per school year). In either case the time devoted to academic subjects will be reduced in comparison with pre-1957 programs. The number of instruction hours in these schools remains less than half that required in the regular secondary schools, i.e., the new labor polytechnical schools.

TABLE II–7.—*Curriculum of evening, alternating-shift, and seasonal upper secondary schools, grades 9–11, 1959–60*

Subjects	Instruction hours per week, by grade			Total instruction hours
	9	10	11	
Literature	2	2	2	6
Mathematics	3	3	3	9
History	1	2/1	2	4/5
Constitution of the U.S.S.R.	.....	.....	1	1
Economic geography	6	2/1	1/2	3
Physics	3	3	2	8
Astronomy	.....	0/1	.....	0/5
Chemistry	1/2	2	2/1	5
Biology	2/1	.....	.....	1/5
Technical drawing	1/2	.....	.....	1/5
Foreign language	2/1	1/2	2	5
Total	15	15	15	45
Elective subjects for improving professional qualifications of pupils	2	2	2	6
Consultations	3	3	3	9
Total	20	20	20	60

Numerator—spring term; denominator—fall term.
Source: *Uchitel'skaia gazeta*, Aug. 29, 1959.

The level of instruction in the schools for rural youth has generally been lower than in the schools for working youth. Because of the apparent inability of the students to master the required subject matter in only 3 years of part-time study, a new program of instruction was instituted in the rural schools in 1955–56 extending the period allotted to the upper secondary grades (8–10) to 4 years.[14] The new programs for seasonal schools, which will operate mainly in rural areas, indicate that the amount of instruction time will continue to be lower than in the urban evening and alternating shift schools.

The steps taken in recent years to extend the network of part-time educational facilities reflected policies endorsed originally in February 1956 by the 19th CPSU Congress, which decided that the schools for working and rural youth should be further developed with a view to their full integration into the school system. To further this objective, recent Soviet policies regarding these schools and adult education facilities in general have emphasized: (1) The provision of varied instruction schedules designed to accommodate students engaged in different full-time jobs; (2) steps to make the instruction programs conform as closely as possible to those in the regular full-time schools, making it possible for students to shift from one to the other; and (3) recognition of part-time education in these schools as "equivalent" to the corresponding level of regular schooling.[15]

The effect of the Soviet educational reforms

[11] *Medynskii–1952*, p. 119; *Medynskii–1955*, p. 112. The English translation of the curriculum from the latter is in *OE–U.S.S.R.*, p. 102.
[12] *Komsomol'skaia pravda*, Aug. 3, 1958.
[13] *Ibid.*, Nov. 15, 1959.
[14] *Narodnoe obrazovanie*, No. 7, July 1955, p. 73.
[15] See discussion in *APS–NarObr–1957*, pp. 315–317.

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of 1958 is to enhance still further the role of part-time adult education. With the cutback of required regular full-time schooling to 8 years, a large proportion of Soviet youth will be channeled directly into full-time employment upon finishing the intermediate, or junior secondary, grades, and consequently the schools for working and rural youth, relabeled with new names, will be the chief means for them to complete upper (senior) secondary education. The types of part-time secondary schools provided for in the reform program were: (1) evening (2) alternating shift, (3) seasonal, and (4) extension-correspondence schools.[16] The first two types will be prevalent in urban areas, the third in rural areas, and the fourth will be available in both.

Although students in these schools will have full-time jobs, it should be noted that the basic reform law, as an incentive, provided that students maintaining a good scholastic standing should be encouraged by reductions of their employment load. This policy was first implemented at the level of higher and secondary specialized education with a government decree in July 1959 instituting a reduced workweek and increased furlough benefits for employed students taking extension-correspondence courses in higher educational and secondary specialized institutions;[17] and in November 1959 similar benefits were extended to students in part-time secondary schools.[18] By the latter measure, the workweek for students in part-time urban secondary schools (grades 8–11) was reduced to 5 instead of the 6 days, which was then the standard Soviet workweek for workers and employees, and it was further stipulated that the 8-hour reduction could be apportioned throughout the week. For students enrolled in rural part-time schools, the reduction of weekly working time was to be two days or the equivalent in total hours.

Students were to receive pay for the days subtracted from their work schedules, but only at a rate equal to half their average daily wage, and only during the actual school year. The maximum number of such special leave days with half-pay is set at 36 per year for students in urban part-time schools, but the employing enterprises may also grant students additional time off without pay if their production schedules permit. Employed students are to be given 20 days' leave from work, with full pay, when preparing for matriculation examinations at the end of the 11th grade.

As a result of these measures, enrollment in part-time secondary schools for employed youths is expected to reach 4.8 million in 1965, as compared to 2.2 million in 1958.[19] But while this will to some extent offset the curtailment of full-time secondary schooling, and while the Soviet authorities claim that the part-time schools provide substantially an "equivalent" education as the regular secondary schools, it is already apparent that the part-time schools cannot turn out graduates of the same quality. This is substantiated by Soviet reports indicating inferior performance by graduates of part-time secondary schools in competitive examinations for admission to higher educational establishments. In fact, the facilities and instruction in these schools are so inadequate and the motivation of students so low that many drop out. In Moscow, for example, the ratio of dropouts in the first 2 months of the 1959–60 school year was 25 percent.[20] The Soviet practice of offering an academic curriculum patterned on that in regular schools (although reduced in scope), without allowance for special interests, abilities, or circumstances of the part-time student, may also be a factor in the study problems and high drop-out rate.

Still higher ratios of dropouts and absences from class have been reported for part-time schools in other parts of the U.S.S.R., e.g., Tadzhikistan and Kirgizia.[21] Of 4,500 employed students who registered to enter evening schools in the Kirgiz SSR in the 1958–59 school year, less than 80 percent (3,578) actually enrolled, and of the latter, only about two-thirds attended school regularly.[22]

[16] *Pravda*, Dec. 25, 1958. See appendix I–ERL to ch. I, art. 5, sec. "a."
[17] *Uchitel'skaia gazeta*, July 14, 1959.
[18] *Pravda*, Nov. 21, 1959.
[19] *Sovetskaia pedagogika*, No. 2, Feb. 1959, p. 3.
[20] See article entitled "Out of Focus," in *Komsomol'skaia pravda*, Nov. 15, 1959, which provides one of the most revealing reports on the deficiencies and problems of the part-time schools.
[21] See *Kommunist Tadzhikistana*, Dec. 2, 1958; *Sovetskaia Kirgiziia*, Aug. 4 and Sept. 1, 1959 (the latter is an article by Education Minister T. Turgunuv of the Kirgiz SSR).
[22] *Sovetskaia Kirgiziia*, Jan. 25, 1959.

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Those students who do attend reportedly do extremely poor work and often fail to prepare their assignments. The reason may simply be that it is too difficult for students to work full time and also keep up with school work. There is little question that it takes "individual stubbornness and persistence" on the student's part to stay in school,[23] and these traits are constantly being urged by the party, the Komsomol, and the trade unions. Sometimes, however, students drop out not because they lack these virtues, but because their employers deliberately interpose barriers to their school attendance ("we need workers, not students"), for example by requiring overtime work or assigning students to work-shifts conflicting with school schedules.[24] Finally, as *Komsomol'skaia pravda* has acknowledged, "there is no incentive for studying since attending school does not assure the employed worker of any greater job benefits." [25] It does not substantially increase his chances of job and pay advancement in the enterprise where he is employed.

So far as physical facilities are concerned, the part-time schools have generally been treated as stepchildren of the regular day schools. Having in most cases no independent buildings or facilities of their own, they have usually been attached to the regular schools and availed themselves of the latter's facilities where these could be spared. In 1954–55, of a total of 7,750 such schools in the Russian SFSR, only 780, or some 10 percent, reportedly were independent units with buildings and facilities of their own.[26] There have been many instances in which the part-time schools could not obtain classroom space in the regular schools and had to make use of whatever quarters were available.[27] This was evidently true even in the Moscow region as recently as the summer of 1959, when the Komsomol was reportedly enlisted to conduct a search for suitable quarters for evening classes.[28]

Teachers in the part-time schools apparently tend to be somewhat lax in their demands on students because of the latter's full-time employment load.[29] Instruction and particularly grading are said to be "superficial," but even so between 25 and 50 percent of the students receive unsatisfactory grades [30] and must often repeat the same grade over again. The low quality of instruction is aggravated by the fact that a majority of the teachers are engaged on a part-time basis. In the rural schools, for example, teachers are paid only for the 6 months that school is in session. For this reason, qualified teachers are not eager to accept assignments to the rural schools,[31] and consequently most of these schools must operate under makeshift arrangements, using teachers from the local regular schools, who often may be more interested in supplementing their incomes than in imparting knowledge. Until recently, all teachers in part-time schools were paid 15 percent less than teachers in regular schools. With the adoption of the educational reforms and the intended expansion of evening and alternating-shift schools, the pay of teachers in these part-time facilities was brought up to the level of that for regular schoolteachers,[32] in an attempt to recruit better teaching staffs for the part-time schools in the future.

Until recently, instruction in part-time secondary schools suffered also from the absence of textbooks prepared specifically to fit their needs, the regular school textbooks having been used instead.[33] Only since 1959 has a serious effort been made to prepare texts especially suited for use in part-time schools for employed youths and adults.[34] In fact, the past Soviet practice was to employ not only the same textbooks but also the same teaching methods in both the regular and part-time schools. In view of the poor results of this policy, it is now recognized that the entire process and method of instruction in part-time schools need to be revised,[35] and the RSFSR Academy of Pedagogical Sciences has begun to study the problem.

These observations indicate that however favorable a picture Soviet propaganda may present of the part-time schools, they actually fall

[23] *Komsomol'skaia pravda*, Dec. 10, 1959.
[24] *Sovetskaia Litva*, Nov. 13, 1956; *Sovetskaia Moldavia*, Apr. 17, May 29, 1959.
[25] Oct. 11, 1959.
[26] *KS–RSFSR–1958*, p. 312.
[27] E.g., see *Pravda Ukrainy*, Nov. 27, 1958.
[28] *Pravda*, Aug. 26, 1959.
[29] *Bakinskii rabochii*, Nov. 30, 1957.
[30] *Sovetskaia Moldavia*, Dec. 8, 1957.
[31] *Komsomol'skaia pravda*, Sept. 30, 1959.
[32] *Pravda*, Mar. 19, 1960. The abolition of pay differentials was decreed effective as of April 1960.
[33] *Komsomol'skaia pravda*, Nov. 15, 1959.
[34] *Sovetskaia Litva*, Sept. 10, 1959.
[35] *Komsomol'skaia pravda*, Nov. 15, 1959.

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far short of providing an adequate substitute for regular full-time secondary education. They now claim a total enrollment of 2.8 million, and the number of graduates in 1960 was approximately 300,000,[36] which is about 30 percent of the total number of 10-year school graduates.

Despite the new emphasis placed on the expansion of part-time education facilities under the 1958 reform program, it has been reported that plans for opening additional part-time schools for employed youth are being "cut back" in many regions because not enough students have the necessary incentive and determination to "stick it out." [37] In order to bolster enrollments, the Soviet authorities have reportedly been contemplating the enforcement of a new policy involving the direct assignment of employed students to these schools.[38] Whether the proposed doubling of enrollments in the part-time schools by the end of the current Seven-Year Plan will help to raise the quality of the education provided is impossible to foresee. Some improvement might well result if, as appears likely, a substantial number of regular schools are converted into evening or alternating-shift secondary schools in the next few years. But a raising of educational standards is not likely to ease the predicament of the many Soviet youths who, in order to complete their secondary education, must combine regular employment up to 38 hours per week with another 20 hours per week of part-time schooling. As long as this situation remains, the problem of imparting a qualitatively adequate education to all, and not just to the determined few, will remain unsolved.

Boarding Schools

In 1956 the 20th Congress of the Communist Party sanctioned a proposal by Khrushchev envisaging the establishment of special-type boarding schools in the Soviet Union. On September 15 of that year the Central Committee of the CPSU and the Council of Ministers of the U.S.S.R. issued a decree [39] concerning the procedures for the establishment of these schools, primarily by converting some of the existing schools but also, in a more limited way, by the construction of new facilities. The development of boarding schools was received both in the U.S.S.R. and abroad as a radical new departure in communist educational policy.

1. *Boarding School Policy and Sources of Support*

Despite Khrushchev's explicit statement that the projected boarding schools were not intended to be institutions for training an aristocratic elite,[40] some Western observers have categorized them as "school[s] which would provide for the systematic education of the elite from early childhood." [41] Contrary to this interpretation, Soviet educators have insisted from the outset that the primary purpose of the boarding schools is to educate children whose parents cannot provide adequate educational opportunities and family guidance.[42] At no time were suggestions made by the Soviet authorities that these schools should be reserved for children of special abilities or "class status." Orphans, children from broken homes, children of "difficult character educability" (a Russian term which embraces juvenile delinquents) are among the groups which will be given first priority in admissions. There have also been indications that the boarding schools were introduced to serve as an aid to working parents,[43] since students will stay at the schools during the week and go home only on Sundays and holidays and during vacations. In a series of talks throughout the country following announcement of the plan, Khrushchev himself urged industrial plants and collective farms to

[36] See appendix table II–C–1.
[37] *Pravda*, Aug. 26, 1959.
[38] *Komsomol'skaia pravda*, Sept. 9 and Sept. 30, 1959.

[39] Malin, *op. cit.*, pp. 289–292. Note that the discussion of boarding schools which follows is concerned with regular civilian primary and secondary schools, and not with military schools of the Nakhimov or Suvorov type (see ch. I). The latter are schools of "closed access," and their students are completely subsidized by the state and are largely accommodated in boarding facilities. The separate network of these elite military institutions will continue to operate as in the past.
[40] Khrushchev speech, in *Dvadsatyi S'ezd Kommunisticheskoi Partii Sovetskogo Soiuza: Stenograficheskii otchet* (The 20th Congress of the CPSU: Stenographic Report), vol. I, Moscow, 1956, p. 81.
[41] Counts, *The Challenge of Soviet Education*, p. 282.
[42] Kairov's speech in *Dvatsatyi S'ezd . . .*, vol. II, p. 324.
[43] *OE–U.S.S.R.*, p. 111.

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give special aid to the establishment of boarding schools so that "mothers may work." [44]

An important feature of the plan is that the cost of maintaining a child in boarding school (except in the case of orphans) is to be borne partly by the state and partly by the parents, the parents' share to be based on ability to pay.

Lack of adequate data makes it impossible to determine what effect the requirement of a financial contribution according to the parents' ability to pay has on the recruitment of boarding school pupils from different strata of the Soviet population. According to one source, the parents' contribution toward the upkeep of children in some boarding schools in Moscow ranges from 700 to 800 rubles per month.[45] If this were generally true, only parents with far above average incomes could afford to enroll their children in boarding schools, since the average wage of Soviet workers and salaried employees is estimated at about 850 rubles per month. Another source places the parents' contribution at 10 percent of the actual cost of the child's upkeep,[46] which certainly means a contribution of less than 700 rubles per month. Also, information is lacking with regard to the payments required of low-income families. It is known, however, that the parents of 18 percent of the 32,000 boarding school students in the RSFSR in 1956–57 were totally exempted from fees,[47] and that in the same year a proposal was made to grant such exemption to any family earning less than 500 rubles a month.[48] An American visitor to the U.S.S.R., who made a survey of the boarding schools in Moscow in November 1960 (there were at that time 57 boarding and 14 extended day schools in the Soviet capital), reported that, according to Soviet officials, the monthly fees ranged from 30 to 470 rubles, the majority of contributions under 100 rubles. In general, the situation in regard to boarding-school fees would appear to have been decidedly chaotic.

When the boarding schools were first introduced in 1956, the Soviet Government fixed the initial target at an enrollment of 1 million students by 1960,[49] but expansion was slower than anticipated, and the target was later abandoned. In the fall of 1956, enrollment was 60,000 [50]; by March of 1957 it increased to 67,000; [51] and in the fall of 1957 it stood at 105,000.[52] Since the adoption of the educational reform program, however, the drive to expand boarding school enrollment has been intensified. The 21st Party Congress, in early 1959, adopted a resolution calling for an enrollment of 2,500,000 students by 1965, the terminal year of the current Seven-Year Plan, representing a 14-fold increase over the 180,000 enrolled in the fall of 1958.[53] Substantial increases were made in 1959 and 1960, and the December 1960 boarding school enrollment was reported as 600,000.[54]

Achievement of the 1965 target depends to a large extent upon the construction of new facilities and the conversion of existing school buildings. So far, however, progress has been unsatisfactory. In the first quarter of 1959, construction lagged about 65 percent behind schedule,[55] with the result that in May 1959 the Central Committee of the Communist Party and the U.S.S.R. Council of Ministers met in special session and ordered strong measures to rectify the lag.[56] These directives reaffirmed the expansion goals and capital investment program for boarding schools during the current Seven-Year Plan and allocated responsibility for their fulfillment to both national and local administrative agencies.[57] It is envisaged that the boarding schools will eventually play a dominant role in Soviet primary and secondary schooling, but present indications are that a lengthy period will be required to build up the necessary facilities. Even if the 1965 enrollment target can be fulfilled, only about 6 percent of all primary and secondary school pupils would be enrolled in boarding schools.

[44] *Sovetskaia Moldavia*, Oct. 23, 1958.
[45] *Moscow News* (English), June 10, 1959.
[46] *APS–NarObr–1957*, p. 273. The total operating cost of boarding schools is reported to be about 6,500 rubles per pupil per year (see below).
[47] Speech by Afanasenko (Minister of Education of the RSFSR), in N. D. Kaz'min (ed.), *Vsesoiuznoe soveshchanie po shkolam-internatam (19–23 aprelia 1957 goda)* (All-Union Conference on Boarding Schools [19–23 April 1957]), Moscow, 1959, p. 14.
[48] Kaz'min, *op. cit.*, p. 72.
[49] *Pravda*, Feb. 26, 1956.
[50] *APS–NarObr–1957*, p. 272. *Izvestia*, Jan. 31, 1957, reports the slightly lower figure of 56,000.
[51] *Dos–1957*, p. 274.
[52] *SSSR–Tsif–1958*, p. 352.
[53] *Pravda*, Feb. 8, 1959.
[54] *Ibid.*, Dec. 21, 1960. A slightly lower figure (540,000) is reported in *SSSR–Tsif–1960*, p. 307.
[55] *Pravda*, May 27, 1959.
[56] *Ibid.*, May 26, 1959.
[57] *Idem.*

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The present lag in the expansion program is attributable to the much higher costs involved in building and operating boarding schools. The cost of construction for ordinary schools is 4,000 rubles per pupil accommodated, whereas for boarding schools the same cost soars to 17,000 rubles.[58] Annual operating and maintenance cost per pupil in regular schools is 800 to 850 rubles, as compared to 6,500 for boarding schools. The Soviet Union is currently making substantially increased capital investments in boarding school facilities. About 15 percent of the total planned investment in new primary and secondary school facilities during the period of the Seven-Year Plan will go into the construction of boarding schools.[59] In addition to the investments directly financed by the state, it should be noted that collective farms and other enterprises are to build and maintain boarding schools out of their own funds.[60] According to reports, some collective farms have already set up such schools.[61] The so-called "host enterprises" (*shefstvuiushchie predpriiatiia*) are to provide the necessary equipment, materials and labor for building and maintaining the schools.

The official policy currently in force with respect to boarding schools was formulated very precisely by Khrushchev in East Germany in the spring of 1959. In answer to questions raised by Social-Democrat newspaper editors, he stated: "We are aiming at the construction of boarding schools on such an extensive scale that all children can be accommodated, and full subsistence from the state can be provided. The time is not too far off when all children whose parents so desire can be brought up in boarding schools." [62] As yet, however, the demand for boarding school accommodations still exceeds the available facilities by a substantial margin.[63] There have been occasional complaints in the past that children of single-child well-to-do families are accepted by boarding schools, while parents with many children (*mnogodetnye*) and small incomes have difficulty in placing their children.[64] At the same time there is abundant evidence indicating that a large proportion of the children in the boarding schools are orphans, neglected or sickly children, or children of unmarried mothers.[65] This would seem to refute the suggestion that the boarding schools were intended to be elite training institutions. Furthermore, it should be noted that admission to boarding schools is largely a matter of parental request, and there are no special academic qualification tests.

2. *Conversion of Orphanages into Boarding Schools*

Actually a good many of the present Soviet boarding schools are not new establishments. The May 1959 directive mentioned earlier explicitly referred to the conversion of certain existing institutions, such as "children's homes" (*detdoma*) or orphanages, into boarding schools.[66] Reports in the Soviet press indicate, moreover, that such conversions had been initiated earlier and were merely continued under the 1959 directive.[67] Thus in many cases, there has been simply a reorganization of an already existing establishment. A typical Soviet press report regarding one of these conversions quotes this statement: "Today [we] say goodby to the children's home which existed for 16 years and begin our work as a boarding school." [68] This suggests that the reported expansion of boarding school facilities and enrollments is to some extent only nominal.

Besides regular orphanages, the Soviet Union has maintained other facilities such as "youth

[58] Kaz'min, *op. cit.*, p. 138. The figures are for 1956 and were revealed by Iakovlev, then Deputy Chairman of the State Planning Committee. He also indicated that the parents' contribution would be about 7 to 8 percent of the total cost of maintaining a child in boarding school.

[59] *Pravda*, Aug. 25, 26, 1959. Out of the construction budget of 27 billion rubles for the U.S.S.R., 2.8 billion will be spent on boarding schools in the Russian SFSR alone. Another 1.2 billion will be spent during the 7-year period in the other 14 republics. Note that 4 billion rubles will provide additional boarding school accommodations for only 235,000 pupils at the planned construction cost of 17,000 rubles per pupil.

[60] *Pravda*, May 26, 1959.

[61] *Pravda Ukrainy*, June 4, 1959. It is interesting to note that there are interregional and intercollective boarding schools springing up in rural areas.

[62] *Pravda*, May 9, 1959.

[63] *Ibid.*, May 26, 1959.

[64] *Sovetskaia Kirgiziia*, Oct. 30, 1956.

[65] Kaz'min, *op. cit.*, pp. 62, 73. In the Ukrainian Republic in 1957, for example, of the total boarding school enrollment of 10,123 children, 1,323 were orphans, 2,712 had one parent, 2,408 were the offspring of unwed mothers, 1,277 were the children of invalids, and 1,476 were from poor families or families with many children. *Ibid.*, p. 28.

[66] *Pravda*, May 26, 1959.

[67] *Ibid.*, Aug. 26, 1959 (survey for the academic year 1959–60 entitled "Soviet Schools on a New Path").

[68] *Uchitel'skaia gazeta*, Sept. 8, 1959.

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colonies" and homes for delinquent children, which also cared for orphans, and boarding schools for physically handicapped children, operated mainly by the republic Ministries of Education. The numbers of all these establishments and of children accommodated in them were: [69]

	1940	1950	1958
Number of establishments	2,967	6,543	4,034
Total number of children accommodated	324,200	635,900	375,000

Of the total number of children in these institutions in 1958, about 15,000, or 4 percent, were in homes and youth colonies under the control of other ministries, notably the MVD. Some children's homes and colonies operate general education schools along the same lines as the regular schools; others place greater emphasis on vocational and skilled labor training. Schools for physically handicapped children generally emphasize arts and crafts.

Colonies for "homeless" (*besprizornye*) children received much publicity in the early and mid 1930's.[70] Formerly these and other types of children's homes were primarily for the care of orphans, but at present a majority of the children cared for by them have one parent, and sometimes both parents, still living.[71] All children placed in these homes become wards of the state. Among them are children of divorced and unmarried parents, as well as children deserted by their parents.

The conversion of some of these facilities into boarding schools has given rise to controversy because of the proviso that parents of children attending boarding school must bear a share of the cost of upkeep. If payment is required of parents with children in such converted establishments, it has been argued, then steps should be taken to assure that parents do not take advantage of the remaining unconverted facilities in order to evade their "responsibilities and get a free ride at the government's expense." [72]

Although the Soviet authorities are reticent regarding juvenile delinquency, the children's homes and youth colonies have among their charges a fair share of "hard-to-educate youngsters" (*trudnovospitaemykh*), a term which has some of the connotations of "juvenile delinquency." One of these institutions in the vicinity of Moscow, for example, is known to be exclusively for delinquent girls.

3. *Boarding Facilities and the Inclusion of Other Schools in the Boarding School Concept*

Boarding schools proper (*shkoly-internaty*) have very frequently been confused with dormitory (*shkol'nyi internat*) or boarding (*prishkol'nyi internat*) facilities attached to schools.[73] Boarding schools as such came into being only in 1956, whereas dormitory and boarding facilities have been in existence for over 30 years and were expanded considerably during and after World War II. A 1948 regulation ruled that boarding facilities attached to schools were designed to accommodate children in grades 5-10, in rural areas primarily, who live 3 or more kilometers from school.[74] In 1954, in the Russian SFSR alone, there were 500,000 pupils using boarding facilities attached to schools.[75] In some union republics, part of these facilities have been converted into boarding schools.[76] On the other hand, where this was not the case, some of the new boarding schools do not yet provide complete boarding facilities.[77]

The student dormitories attached to schools (*shkol'nye internaty*) were an improvisation which developed mainly in rural areas of sparse population and lacking adequate transportation

[69] *NarKhoz–1959*, pp. 828–829; *KS–1956*, p. 198.

[70] One of the most publicized was the Dzerzhinskii Colony, near Khar'kov, where Makarenko's renowned disciplinary pedagogy had its major "experimental" test. In the 1930's, the forced collectivization of agriculture, involving the "liquidation" of several hundred thousand peasant "*kulaks*," was responsible for a marked increase in the number of homeless children.

[71] *Izvestia*, June 9, 1959, published an article which revealed that some 60 percent of the inmates of children's homes in Saratov Province had at least one living parent.

[72] *Izvestia*, July 9, 1959.

[73] *BSE–YB–1958*, p. 90.

[74] Deineko, *Spravochnik*, pp. 172–178.

[75] Luzhin, *op. cit.*, p. 27.

[76] Kaz'min, *op. cit.*, *passim*.

[77] *Sovetskaia Estonia*, Jan. 13, 1959. In the Estonian SSR it was planned to increase boarding school enrollment from 720 in 1958 to 2,000 in 1959, a large proportion of this because of conversion.

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facilities.[78] Paved roads are virtually nonexistent in many rural areas, and there is no school bus service, making it impossible for many children not living in close proximity to a school to commute daily. In some cases the distance from a child's home to the nearest 7-year or 10-year school is as much as 15 miles. Although 4-year primary schools having a single teacher and only one classroom were often established to serve rural districts with less than 10 pupils, 7-year schools were set up to serve districts large enough to provide a minimum enrollment of 50 to 100 pupils and were placed approximately in the center of the school district. Children living too far away to be able to commute to and from school often were put up by relatives or friends whose homes were closer to the school. More rarely, a "common building" or hut, called an *internat,* was set up adjacent to the school, providing sleeping and boarding accommodations during the school week for pupils unable to commute. Accommodations in the *internat* were extremely primitive: students were provided with sleeping benches without mattresses or pillows, and there were no indoor toilets. A teacher, with the help of a scrub woman and part-time matron-cook, saw to it that the children were looked after and fed.

The availability of boarding facilities varies greatly in different localities. In the Latvian SSR, 15 percent of all pupils of primary and secondary school age have been reported enrolled in boarding schools or schools having attached dormitory and boarding facilities,[79] and in some isolated mountain localities the ratio is as high as 100 percent. Murgab, in Central Asia, for example, has one secondary school with all the students living in an *internat.* In other regions, however, boarding school facilities are scarce. In the Kirgiz SSR, for example, there were only 7,000 boarding school pupils in 1959 (up from 3,000 in the fall of 1958),[80] representing only about 2 percent of total enrollment (as of 1957).[81]

A further question to be considered has to do with the scope of the term "boarding schools" as used in Soviet announcements of planned enrollment targets. The section dealing with boarding schools in the educational reform law of 1958 states that "the system of boarding schools, *as well as of schools and groups with an extended school day,* is to be expanded." [82] Subsequently, when the government announced its plan to expand "boarding school" enrollment to 2,500,000 pupils by 1965,[83] it failed to specify whether this target applied only to "boarding schools" proper or also included "schools and groups with an extended school day." Later information from Soviet sources, however, leaves no doubt that the target applies to both categories.[84] Enrollment in the extended day schools in the fall of 1960 was 525,000.[85] American visitors at that time reported that in Moscow, both boarding schools and extended day schools were under the single management of the boarding school office of the city department of education, a probable indication that the development of both types of facilities is regarded by the government as a joint program.

Schools with an extended school day are obviously not full boarding schools.[86] The pupils stay at school 9 to 12 hours daily and have their meals there, but they sleep at home. This is considered "partial boarding" and is intended primarily as an aid to working parents. The extended day schools actually operate in schools; the extended day groups, on the other hand, are not necessarily set up in a school building, but may be set up in trade union clubs or even in apartment buildings or housing projects.[87] Here, in specially reserved rooms, and under the supervision of a teacher from a nearby school, the activities are carried on for several hours after

[78] An interesting discussion of these schools may be found in: Akademiia Pedagogicheskikh Nauk RSFSR, V. M. Dmitriev (ed.), *Organizatsiia i planirovanie vseobshchego srednego obrazovaniia* (Organization and Planning of General Secondary Education), Moscow, 1957, especially pp. 234–237. This is a publication of the Academy of Pedagogical Sciences of the RSFSR and was prepared on the basis of research sponsored by its Institute of Pedagogical Theory and History.

[79] *BSE* (2d ed.), vol. 6, p. 120. Of a total of 270,000 pupils, 14.8 percent, or 40,000, were in *internaty.*

[80] *Sovetskaia Kirgiziia,* Sept. 1, 1959.

[81] *SSSR–Tsif–1958,* p. 400.

[82] Article 5 (*Pravda,* Dec. 25, 1958). (Emphasis added.) See appendix I–ERL.

[83] *Pravda,* Feb. 8, 1959.

[84] O. Rostovtseva *et al.,* "Ot grup prodlennogo dnia k shkolam prodlennogo dnia" (Transition from Groups with Extended School Day to Schools with Extended Day), *Narodnoe obrazovanie,* No. 4, 1959, pp. 18–22.

[85] *Pravda,* Dec. 21, 1960.

[86] M. I. Kondakova (ed.), *Organizatsiia raboty v shkolakh i gruppakh prodlennogo dnia* (Organization of Work in Schools and Groups with an Extended School Day), Moscow, 1960, *passim.*

[87] *Ibid.,* p. 41.

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the children have come from regular school. Neighborhood extended day groups model their activities after the extended day schools, and may also provide one meal. This kind of arrangement is obviously intended as a convenient form of child supervision while the parents are working. The activities of both the extended day schools and the extended day groups are financed by the trade unions of the manufacturing enterprises where the parents are employed.

To sum up, the current situation in regard to boarding schools is as follows: (1) Former children's homes and orphanages are now being converted *en masse* into boarding schools. The change here is in name only. (2) Previously existing dormitory (and boarding) facilities in rural and inaccessible localities are also being converted into boarding schools. (3) Most of the new-type boarding schools which have been established in the cities are converted regular schools, with one or two floors of classrooms transformed into dormitories. There are undoubtedly some newly constructed facilities, but the fact that none of the visitors to the Soviet Union has ever been shown boarding schools specifically designed and constructed for this purpose makes one wonder if their number is not exceedingly small. (4) There are partial boarding schools where usually one hot meal is served but the pupils do not live in dormitories. (5) Finally, there are neighborhood extended day groups where the children are supervised by specially assigned teachers.

It is reasonable to surmise that the projected increase in boarding school enrollment during the current Seven-Year Plan will take place largely in the partial boarding schools operating on an extended school day basis, rather than in full boarding schools. Expansion of the latter since 1956 has been lagging, primarily because of inadequate investment in the conversion of old schools and the construction of new facilities. At least quantitatively, however, the inclusion of extended day schools in the announced enrollments for "boarding schools" will probably lend the program an appearance of progress.

4. *Type of Instruction Offered in Boarding Schools*

When the new boarding schools were first established in 1956, they were designated as 10-year general education schools, and the curriculum was patterned after that of the regular schools. It was explicitly stipulated, however, that the boarding schools would stress the preparation of students "for practical activity and labor in material production." [88] Some Soviet educators and scientists advocated initially that the boarding schools should concentrate on mathematics and the sciences: Nesmeianov, for example, voiced the hope that the boarding schools would serve as "a gigantic new lever for uncovering and molding Mendeleevs." [89] So far, however, this hope has not materialized. As already pointed out, the selection of students for enrollment in boarding schools has not been oriented toward discovering and developing "exceptional talent," and the type of training offered by these schools since their establishment has tended strongly toward laboring activity [90] geared to local employment conditions.[91] This is particularly true of boarding schools maintained by industrial plants, which tend to emphasize the specific types of vocational instruction needed in their own production activities.[92] Thus, the present Soviet concept of boarding school education has from the start rested upon the idea of labor training and the acquisition of vocational skills.[93]

Another feature of boarding school training is the emphasis on "character formation" through regimentation. The Minister of Education of the RSFSR has remarked that "there are boarding schools where children live 12 to 14 hours by the ring of the bell and strict regimentation." [94] He was critical of this tendency, but there is no doubt that it is a prevalent one. Children usually attend classes 4 to 6 hours in the morning, engage in skill training in the afternoon and prepare homework under supervision in the afternoon and part of the evening.

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[88] *APS–NarObr–1957*, p. 273.
[89] Kaz'min, *op. cit.*, p. 131.
[90] *APS–NarObr–1957*, especially pp. 274–277.
[91] A. Izmailov, "Dva goda raboty shkol-internatov" (Two Years' Experience with Boarding Schools), in *Kommunist* (Kirgiz SSR), vol. 32, No. 6, June 1958, pp. 35–42.
[92] Kaz'min, *op. cit.*, p. 29.
[93] *Ibid., passim.* See especially Afanasenko's statement (p. 145) that boarding schools should be organized in a "semi-Spartan way," and that the students should be given a workload leaving no opportunity for indulgence in comforts and leisure.
[94] *Ibid.*, p. 24.

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During the time that remains in the evening they engage in "sociorecreational" activities. Sandwiched in during the day are three meals, two to four periods of calisthenics, "recreational walks," etc. Thus the "entire life of the child is organized," [95] and very little room remains for individual initiative and self-development. In addition to the heavy schedule just described, moreover, a number of boarding schools have introduced "self-service," requiring all cleaning and maintenance to be performed by the pupils.[96]

In conformity with the postreform Soviet school structure, there will be two types of boarding schools: one with grades 1–8 and the other with grades 1–11.[97] In addition to general education of the type offered in the new 8- and 11-year school curricula, both kinds of boarding schools will continue to stress the development of vocational and labor skills. Apart from this and the introduction of greater regimentation, it remains unclear just what will be the "exceptional" contribution of the boarding schools to training the "best-educated builders of communism." [98]

Content of Soviet Primary and Secondary Education: Curricula and Programs of Study

Although in theory the individual republics of the Soviet Union control education within their own jurisdictions, in practice every aspect of the Soviet school system is centrally planned, directed and controlled. Each republic has a Ministry of Education which is supposedly responsible for the content of education in its own schools, yet the programs of instruction offered by schools throughout the U.S.S.R. conform to a uniform, centrally prescribed pattern. Local educational administrators, school directors and teachers are without independent authority to decide the basic content of instruction and are allowed only minor discretionary authority in the implementation of the prescribed curricula and syllabi of instruction. The republic Ministries of Education, however, are permitted to adapt the prescribed basic curricula to local peculiarities by variations in the language of school instruction in non-Russian national republics, in the specific types of vocational instruction offered, and in foreign language instruction.

In deciding the basic content of school instruction, the central organs of the Communist Party and the Government may sometimes take into consideration the views and proposals of Soviet educational leaders, but the determining factor is their own conception of the tasks which the educational system must fulfill in order to meet the current as well as longer-range needs of the Soviet state. Occasionally, of course, modifications have to be made, when it becomes obvious that the measures for the attainment of the set goals either cannot be implemented or would otherwise lead to undesirable effects. Both Stalin's school reforms in 1931-34 and Khrushchev's 1958 reform program embodied the conceptions the Government held in regard to the needs of the state. They also represented a basic mandate for the whole educational system, to be carried out through a centrally formulated, standard curriculum serving as a common core and basis for the formulation of detailed curricula and school programs by the educational authorities at the republic level. On the basis of directives issued by political rather than educational authority, standard curricula were designed by the RSFSR Ministry of Education's research division, the Academy of Pedagogical Sciences of the RSFSR, and from these, individual regional units then derived a set of curricula. Thus, uniformity has been a characteristic feature of Soviet education at the primary and secondary levels for the last three decades.

Uniformity in school curricula, course content, textbooks, and teaching methodology does not mean, of course, that educational standards are uniform in all schools. Actually, the standards of instruction vary considerably in different schools and different localities, and it is therefore essential to draw a distinction between the prescribed standard pattern of Soviet education and the actual implementation of this pattern in the schools.

Soviet educators state that one of the essential foundations of the Soviet system of edu-

[95] *APS–NarObr–1957*, p. 279.
[96] Office of Education, *Soviet Commitment to Education*, pp. 55–60.
[97] *Pravda*, Aug. 26, 1959. See also appendix I–ERL.
[98] *Narodnoe obrazovanie*, No. 11, November 1957, p. 29.

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cation is the principle of the "unified school" (*edinaia shkola*).[99] Under this principle, all regular general education schools (formerly 4-year, 7-year, and 10-year; now 4-year, 8-year, and 11-year) use a "unified instruction program" (*edinyi uchebnyi plan*), which is also adapted for use in other general education schools such as the part-time schools for working and rural youth and for adults, schools for the physically handicapped, etc. It is claimed also that the programs of instruction in special schools of the vocational type and secondary semiprofessional schools are based on "interlinking" (*priemstvennost'*), which means that students completing these programs are qualified to go on into higher education on an equal footing with graduates of secondary general education schools. This latter claim is extremely dubious, but insofar as the 10- or 11-year general education schools are concerned, there is little question that a considerable degree of uniformity in the content of instruction has been achieved. This is particularly true for science and mathematics subjects, which, as the subsequent analysis will show, are uniform in all schools regardless of location or language of instruction.

1. *Stages in the Development of Soviet School Curriculum*

There have been three major stages in the development of the primary and secondary school curriculum in the Soviet Union, corresponding to the three historical stages discussed above: (1) The experimental period, from 1918 until about 1931 (although school reorganization continued from 1931 until 1934); (2) the period of relative stability and standardization, from 1934 until 1954; and (3) the period of adjustment and reform which began in 1955 and includes the current reform programs initiated in 1958.

Soviet accounts of the development of education in the U.S.S.R. generally take 1917 as their starting point, picturing the state of education in the pre-Revolutionary period as hopelessly backward and inadequate. Whatever educational progress had been made before the Revolution, they claim, was achieved against the opposition of the Czarist regime and the Church. Needless to say, these allegations are hardly borne out by a realistic appraisal of Russian education before the Revolution.[1] Actually, on the eve of the First World War, education was probably more advanced in Russia than in many other countries. There was a relatively well-developed system of elementary schools,[2] although the secondary school system was highly selective.[3] The school system, moreover, had a stable pedagogical basis whose indigenous development was reinforced by the adoption of some West European concepts. Whereas in America, education developed on the basis of local autonomy, in Russia as in many European countries the central government fixed curricular requirements for the public schools. Russian schools also conformed to the European pattern in combining uniformity of educational content at the elementary level with diversity on the secondary level.

A wide variety of secondary schools—classical gymnasia, progymnasia, *real*-schools (science-oriented), commercial schools, military schools, special schools for girls—offered diverse programs of instruction. For each *type* of secondary institution, however, there was a prescribed standard program, based on a uniform curriculum, standardized course content and textbooks, which every student enrolled in that type of institution was required to take. Thus, as in many European countries today, there were several standard curricula, each for a different type of secondary school. This provided diversity, but some of the curricula had so few subjects in common that transfer from one type of school to another was not always possible.[4] These practices resulted in *furcation*,[5] that is, the divi-

[99] *Medynskii–1955*, p. 14; *APS–NarObr–1957*, p. 90.

[1] For a historical survey of Russian education, see W. H. E. Johnson, *Russia's Educational Heritage*, Pittsburgh: Carnegie Press, 1950.

[2] Eight million pupils were enrolled in Russian elementary schools in 1914. This figure represented over two-fifths of the elementary school-age population, a rate of school attendance unmatched even today in many countries of the world.

[3] N. A. Konstantinov and V. Ia. Struminskii, *Ocherki po istorii nachal'nogo obrazovaniia v Rossii* (Essays on the History of Elementary Education in Russia), Moscow, 1953.

[4] For example, some classical gymnasia did not teach advanced mathematics, while *real*-schools did not offer classical languages. Russian language, religion and geography were among the subjects common to all curricula.

[5] The Russian word *furkatsiia* is simply an adaptation of the French word *fourche* (to fork). The most applicable American educational term is, perhaps, "multitrack education," although it must be borne in mind that in the pre-Revolutionary period there were separate schools for each track and that the content of instruction within each track was uniform.

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sion of schooling (especially on the secondary level) into several differentiated programs, each having its own standard curriculum and prescribed course content.

The first phase: the experimental period.— Just as the Communist Revolution destroyed the old social order, so it destroyed the old schools. Abolishing the old system of many types of schools with broad diversity, the new Soviet Government in October 1918 adopted a resolution for the establishment of a "unified labor school." Responsibility for the design of the new school programs was delegated for the next decade to the State Academic Council (*GUS*). The resolution stated:

> From nursery schools to universities, the system of school represents one unit, one continuing ladder. All pupils must enter one and the same type of school and begin their education in the same way, and all will have the equal right to ascend the ladder up to the top.[6]

Thus was the 9-year school established. It was made up of a first-level school (5-year, ages 8–12) and a second-level school (4-year, ages 13–17). The programs of these labor schools were said to be based on the "principle of transferability," i.e., the pupils in all the schools throughout the country were to follow identical instruction programs so that each grade and each level of schooling would "interlock."

In 1920 three recommendations were made in regard to the curricula: (1) The complete secularization of education, with all parochial schools and religious teaching to be abolished; (2) the introduction of "laboring activity" in combination with instruction; and (3) the abolition of sharp delineation lines between individual subjects of instruction, so that subjects in the same topical areas (i.e., mathematics, chemistry, physics and biology) would be blended together. This last development came to be known as the "complex method" of the labor schools, and it dominated the instruction process in the early 1920's.[7]

But it was the "laboring activity" which was the moving spirit of the new education, and it was viewed as the means of deemphasizing the traditional subjects. "Laboring activity" was any activity associated with useful physical labor—in workshops, field work, or "self-service." [8] Although individual subjects of instruction were listed in the curriculum,[9] their teaching, in most of the schools following the "complex method," was blended so closely with "laboring activity" (and with each other) that often the individual subjects were not really taught at all. Furthermore, the program was "organized" in such a way that decimal fractions could be taught before the pupils knew how to count and social concepts discussed before they could read or spell "proletariat."

In 1924 the curriculum was revised. The subject content requirements were made more specific and the proper teaching sequence was partially restored. The "complex method" remained, however, and the chaos which it fomented was so widespread that by 1925 some educators who opposed it declared that "nothing undermines the complex programs more than their own implementation." [10] Although the debate on what and how to teach continued into the second half of the 1920's,[11] the increasing emphasis on polytechnism and skill training made the inadequacies of the "complex method" a secondary issue. While polytechnical training continued to gain momentum in the late 1920's, other forces advocating a return to traditional, academically oriented programs were already in motion.

In 1927 the *GUS* designed a new version of the primary and secondary school curriculum, which clearly outlined a return to an academic program, based on traditional school subjects,[12] and this curriculum was scheduled to go into operation in 1929. It did not, probably be-

[6] *APS–NarObr–1957*, p. 33.

[7] For an extensive discussion, see Z. I. Ravkin, *Sovetskaia shkola v period vosstanovleniia narodnogo khoziaistva, 1921–1925* (The Soviet School in the Period of Reconstruction of the National Economy, 1921–1925), Moscow, 1959, especially pp. 33–49.

[8] "Self-service" was condemned in 1921, however, and was not again considered part of the student's "laboring activities" until 1959.

[9] Tul'skii oblastnoi otdel narodnogo obrazovaniia (Tula Regional Office of Public Education), *Narodnoe obrazovanie v Tul'skoi oblasti* (Public Education in the Tula Region), Tula, 1959, pp. 133–134. This source gives the curriculum for 1923. The 1920 curriculum may be found in *ASP–NarObr–1957*, pp. 36–38.

[10] Ravkin, *op. cit.*, p. 123.

[11] See A. P. Pinkevitch, *The New Education in the Soviet Republic*, ed. by G. S. Counts, New York: The John Day Co., 1929.

[12] F. F. Korolev, *Sovetskaia shkola v period sotsialisticheskoi industrializatsii* (Soviet Schools in the Period of Socialist Industrialization), Moscow, 1959, p. 89.

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TABLE II–8.—*Summary comparison of postwar curricular changes in Soviet 10- and 11-year primary and secondary schools*

[Total number of instruction hours devoted to subject and distribution in percent]

	1947		1952		1955		1957		1959–63	
	Instruction hours	Percent	Instruction hours	Percent	Instruction hours	Percent	Instruction hours	Percent	Instruction hours	Percent
Group I: General (languages, literatures, humanities and social sciences)	5,067	53.0	5,214	53.9	4,653	47.2	4,692	44.2	4,884	38.0
1, 2. Russian language, Russian literature and other literature	3,003	31.4	3,053	31.5	2,788	28.3	2,856	26.9	2,926	22.8
3. Foreign language	743	7.8	726	7.5	660	6.7	680	6.5	726	5.6
4. History	710	7.4	709	7.3	660	6.7	663	6.2	728	5.7
5. Constitution of U.S.S.R.	66	0.7	66	0.7	33	0.3	.....	.....	70	0.5
6. Geography	545	5.7	528	5.5	479	4.9	493	4.6	434	3.4
7. Psychology	.....	.....	66	0.7	33	0.3	.....	.....	.....	.....
8. Logic	.....	.....	66	0.7	.....	.....	.....	.....	.....	.....
Group II: Scientific (mathematics and sciences)	3,431	35.9	3,399	35.2	3,300	33.5	3,332	31.4	3,727	29.1
9, 10. Mathematics (arithmetic, algebra, geometry, trigonometry), total	2,112	22.2	2,112	21.9	1,980	20.1	2,023	19.2	2,139	16.7
11. General science (nature studies, introductory and biology)	462	4.8	446	4.7	396	4.1	408	3.8	511	4.0
12. Chemistry	346	3.6	329	3.4	347	3.5	340	3.2	407	3.2
13. Physics	478	5.0	479	4.9	544	5.5	527	4.9	631	4.9
14. Astronomy	33	0.3	33	0.3	33	0.3	34	0.3	39	0.3
Group III: Applied (activity, skill and vocational arts)	1,056	11.1	1,056	10.9	1,904	19.3	2,593	24.4	4,217[b]	32.9[b]
15. Physical education (including military training for boys)	594	6.3	594	6.1	660	6.8	782	7.5	800	6.2
16. Drawing	165	1.7	197	2.0	198	2.0	204	1.9	330	2.6
17. Drafting	165	1.7	132	1.4	132	1.3	136	1.3	71	0.6
18. Singing	132	1.4	132	1.4	198	2.0	204	1.9	287	2.2
19. Manual labor and school work shops	.....	.....	.....	.....	330	3.3	408	3.8	2,073	16.2
20. Obligatory excursions to production enterprises	.....	.....	.....	.....	188	1.9	191	1.7	.....	.....
21. Practical experience in industrial or agricultural enterprises	.....	.....	.....	.....	198	2.0	.....	.....	430[a]	3.3
22. Fall and spring field work and industrial work after school	.....	.....	.....	.....	.....	.....	102	1.0	.....	.....
23. Fundamentals of production (course)	.....	.....	.....	.....	.....	.....	374	3.6	[a]	.....
24. Practical work (summer employment) after the end of the school year	.....	.....	.....	.....	.....	.....	192	1.7	.....	.....
Total	9,554	100.0	9,669	100.0	9,857	100.0	10,617	100.0	.....	.....
Optional vocational electives	none	.....	none	.....	none	.....	170	.....	226[b]	1.8
Grand total	9,554	.....	9,669	.....	9,857	.....	10,787	.....	12,828	100.0

Sources and Notes: Summary data from Appendix Tables II–B–1; II–B–2; II–B–3, II–B–4 and II–B–5. Data for 1947, 1952 and 1955 refer to all types of schools; data for 1957 refer to urban schools only. There are differences between urban and rural schools in the hours required for the fall and spring fieldwork which account for the differences in group III and total (see table II–B–4 for details). Years refer to academic years, i.e., 1947–48, etc. Data for the 1959–63 curriculum refer to 11-year complete secondary labor-polytechnical schools.

[a] For 1959–63 curriculum, combined allocation of hours for various skill activities is included under "manual labor and school workshops."

[b] Optional vocational subjects in 1959–63 curriculum are counted in group III and are a part of the regular curricular structure.

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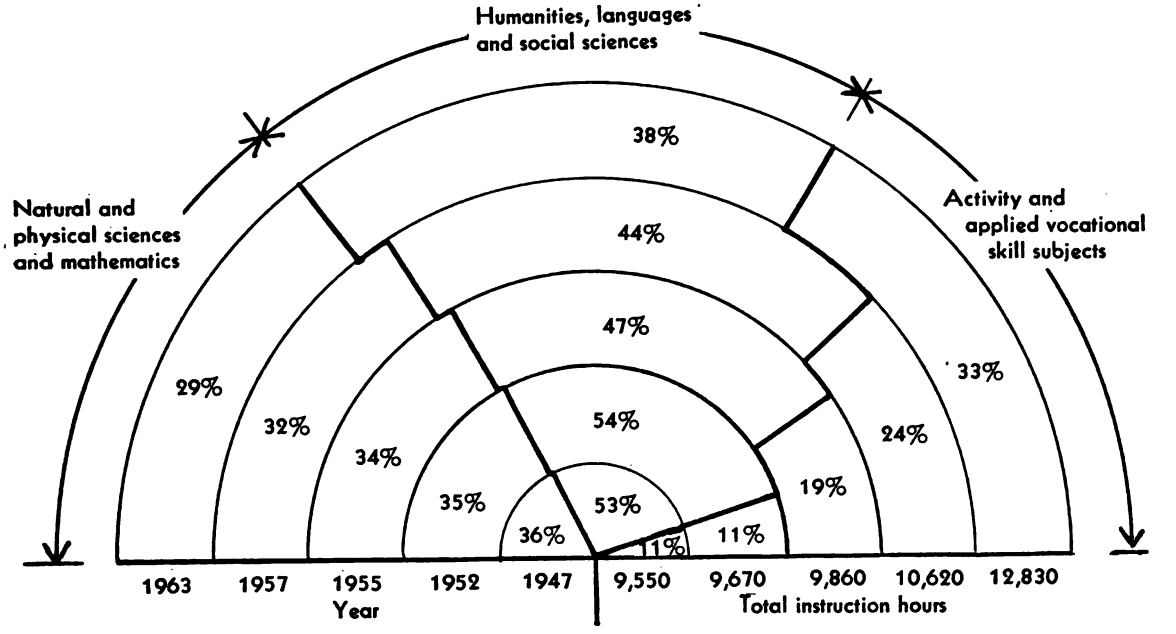
CHART III.—CHANGES IN THE STRUCTURE OF SOVIET PRIMARY AND SECONDARY SCHOOL CURRICULUM, 1947–63 (in percent of total instruction hours)



Sources: Appendix tables II–B–1; II–B–2; II–B–4; and II–B–5. See also text table II–8. Percentages and total number of curricular hours rounded.

cause of the continuing stress on polytechnical education in order to turn out as rapidly as possible the young laborers required by the First Five-Year Plan. It is important to note, however, that the ideas contained in it antedated the actual introduction of a rigorous academic program in 1934.

The second phase: the period of a standard academic school.—Transition to this stage was gradual. The period of experimentation with the "complex method" in Soviet schools was brought to a halt in December, 1927, when the 15th Congress of the Communist Party announced the goals of the First Five-Year Plan. In 1928 and 1929 several additional party decrees were issued stressing the need for strengthening secondary education along traditional lines so that secondary school graduates would be academically prepared to go on to higher education.[13] In 1930 elementary schooling was made compulsory, and in September of the following year the Central Committee of the Communist Party issued a decree concerning the basic structure and content of primary and secondary education.[14] The school programs were redefined in 1932, and the rules for the use, writing and contents of textbooks in 1933. The final structure of the school system and the curriculum was defined in 1934, and with minor modifications this was the system which continued intact into the mid-1950's.[15]

The third phase: current reforms.—The third stage in the development of the Soviet primary and secondary school curriculum is of the most

[13] In 1929 also, Lenin's theses on education were published for the first time, in an effort to support the return to traditional schooling.

[14] Deineko, *Spravochnik*, pp. 17–25.

[15] The 1947 curriculum presented in appendix table II–B–1 is actually the one originally used in the late 1930's.

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interest for this study, and, in addition to the section above on polytechnical instruction, it will be discussed in detail below.

2. *The Structure of the Soviet Primary and Secondary School Curriculum in the Postwar Period*

Soviet primary and secondary school curricula for various years are presented in the appendix to this chapter.[16] Each curriculum gives information on the weekly number of instruction hours in each subject and the number and allocation of hours by grade level. Based on these appendix curricula, table II-8 summarizes the material, by subject, in Soviet primary and secondary schools for various years, and chart III depicts the area changes graphically. Two trends immediately become obvious upon examining the data.

One is the steady increase in the total number of instruction hours, from 9,554 in 1947 to 12,828 in the 1959-63 curriculum. The extra hours result from increasing the weekly instruction load, lengthening the school year, and, in the 1959-63 curriculum, adding an extra grade to the former 10-year program.

The second trend which may be observed is the change in the proportion of time devoted to the three main areas of the curriculum: (1) General academic; (2) scientific; and (3) applied subjects. In the 1952 curriculum the number of hours devoted to general academic (5,214) and scientific (3,399) subjects represented 53.9 and 35.2 percent, respectively, of the total number of hours; but in the 1955 and 1957 curricula, the number of hours devoted to these subjects declined, and their proportion in relation to the total was also reduced, with a sharp rise in the proportion of time devoted to applied subjects (from 10.9 percent in 1952 to 19.3 percent in 1955, and 24.4 percent in 1957). Thus, purely academic areas were being deemphasized in order to allow more time for vocational skill subjects.

In the 1959–63 curriculum, while the absolute number of instruction hours devoted to general academic subjects increased (from 4,692 in 1957 to 4,884 in the new curriculum) and hours devoted to scientific subjects also increased (from 3,332 to 3,727), the *proportion* of time devoted to these subjects dropped even further, while the proportion of time devoted to applied subjects increased again from 19.3 percent in 1955 to 32.9 percent in 1959-63.

The reform curriculum for 1959–63 will thus not only increase the time devoted to academic subjects, but will particularly intensify training in vocational-technical subjects,[17] as indicated by the following comparison:

Groups of subjects	10-year school— 1957 curriculum		11-year school— 1959–63 curriculum	
	Instruction hours	Percent	Instruction hours	Percent
Languages, literature, humanities and social sciences	4,692	44	4,884	38
Natural and physical sciences and mathematics	3,332	31	3,727	29
Applied activities and vocational skill subjects	2,593	25	4,217	33
Total	10,787	100	12,828	100

The bulk of the additional 2,041 hours of instruction is to be allocated to activity, general polytechnical and special vocational subjects, workshop and industrial practice. The sciences and mathematics will gain about 400 instruction hours, while humanities will gain about 200 hours. This simplified redistribution overlooks the fact that the polytechnical subjects will be largely science- or technology-oriented, given as applied courses, but closely linked, nevertheless, with regular science and mathematics instruction. This is particularly true of the course in the fundamentals of production given in the upper secondary grades (item 23 on

[16] Appendix tables II–B–1 through II–B–5, for 1947, 1952, 1955, 1957, and 1959–63, respectively.

[17] For an analysis by level of grades, see Medlin, Lindquist and Schmitt, *op. cit.*, p. 37.

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table II-8), which will deal with industrial applications of physics and chemistry.

There is thus now sufficient evidence to establish conclusively that the current Soviet program of educational reform will not diminish, but will in fact intensify, the scientific and technical orientation of Soviet schooling. On the other hand, general academic education, particularly the social sciences and humanities, will suffer by comparison. The reform program calls for an extension of the period required to complete senior secondary schooling from 10 to 11 years, of which only the first 8 years (elementary and junior secondary) are compulsory. After completion of the new 8-year school, most youths will be integrated directly into productive activity in the labor force and will be able to continue their education only on a part-time basis. The three upper grades, 9-11, will be called "secondary general polytechnical school with production training," and will be more selective than were grades 8-10 prior to the reforms. However, for those who do go on to grades 9-11, the academic requirements will continue, in addition to the training in a specialized vocational skill.

3. *Contents of Subjects of Instruction of Soviet Primary and Secondary Schools*

The contents of individual subjects of instruction in Soviet primary and secondary schools for various years have been discussed in a number of American studies.[18] and there is no need here to treat each individual subject in detail.[19] Attention will be focused rather upon a few selected topics and a summary of course contents with particular regard to the new 11-year program.[20]

In general, the curricular contents of the two academic groups—humanities-languages and sciences-mathematics—have remained the same during the last two decades and are expected to be the same in the new curriculum.[21] The course contents of individual subjects are briefly, as follows. (For the number of hours devoted to each subject, see table II-8 above).

Elementary grades.—As in the past, current instruction in the elementary grades (1–4) is aimed mainly at developing skills in the "three R's." Instruction in reading and writing is carried on in the native language, although in all schools conducting instruction in a language other than Russian, instruction in the Russian language is also required. The textbooks and readers are written so as to introduce the pupil in grades 2–3 to nature studies, elementary history and geography. In grade 4, history and nature studies (coupled with some geography) are taught as separate subjects. In addition, all pupils are required to take physical education, music and drawing. In the new programs more hours are devoted to workshop activities. In the elementary grades, all the instruction is given by the same teacher; beginning in grade 5, each subject is taught by a teacher who has specialized in that subject.

Russian language and literature.—Courses in the Russian language in grades 5–8 concentrate, as in the past, on reading, spelling and essay writing, with heavy emphasis on grammar and syntax. The reading assignments include mostly the Russian classics and Soviet writers. Poems must be memorized and themes must be written. The selection of reading material is based not only on literary considerations, but also is oriented toward projecting an image—the dark pre-Revolutionary past vs. the glorious present. The "social message" is of great importance. The readings are arranged in chronological order—from the folklore of the 19th century to current Soviet literature. Only at the end of the 8th grade is an attempt made to introduce the pupil to the theory of literature.

The literature courses in grades 9–11 of the

[18] *OE–U.S.S.R.*, pp. 67–83; Office of Education, *The Soviet Commitment to Education*, pp. 30–45; Korol, *Soviet Education*, pp. 46–64, 85–98; Bereday, Brickman and Read, *op. cit.*, pp. 168–77, 196–201. For curricula in sciences and polytechnical subjects, see especially Medlin, Lindquist and Schmitt, *op. cit.*, pp. 41–124.

[19] For a digest of the subjects offered in the 1952 curriculum, see also discussion in *SPM*, pp. 275-77.

[20] *Uchitel'skaia gazeta*, Aug. 29, 1959, gives the curriculum for the RSFSR; *Pravda vostoka*, July 5, 1960, for schools of the Uzbek republic; *Bakinskii rabochii*, Sept. 3, 1959, for schools of the Azerbaidzhan republic. Each of these sources also discusses course contents. See, in addition, the detailed course syllabi in: MP RSFSR, *Programmy . . .* (in the respective subject), 1959 and 1960 editions.

[21] As an exception, psychology and logic were introduced in the upper grades of the secondary school in the late 1940's but were abandoned in the mid-1950's. The course on the Constitution of the U.S.S.R., which is largely an indoctrination course of contemporary Soviet developments, was consolidated with the regular history course in the 1957 curriculum, but was reintroduced as a separate subject in the new program in grade 11. Another indoctrination course, foundations of political knowledge, is scheduled to be introduced in 1962.

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new curriculum are structured in the same fashion as in grades 8–10 of the old curriculum.[22] In grades 9 and 10 attention is devoted to systematic readings of pre-Revolutionary Russian literature and to style and content analysis. In the 10th grade, Shakespeare and Goethe are studied in detail, and other Western authors are assigned as outside reading—among them Mark Twain and Jack London. In the 11th grade the course devotes attention exclusively to Soviet literature. Literary analysis has a sociohistorical or sociopolitical interpretation.

Native language and literature.—Instruction in the native language and literature, which is optional in the new curriculum, is conducted in much the same fashion as instruction in Russian language and literature. Since it requires additional instruction hours (see below), for pupils in Russian language schools who elect to take it, the curricular requirement is increased considerably (in some schools by somewhat fewer hours due to the reduction in hours in other subjects). Because of some special features connected with bilingual instruction in the schools, a separate section on this subject is included below.

History.—Instruction programs in history are still undergoing revision as of 1961, in accordance with a special decree of the Central Committee of the CPSU on October 8, 1959,[23] which called for a strengthening of history programs and the rewriting of all history textbooks. Beginning in 1962, history programs will be structured as follows:

Grade 4—Highlights of history of the U.S.S.R.
Grade 5—Ancient history
Grade 6—Medieval history
Grades 7–8—Introductory history of the U.S.S.R. and modern history of foreign countries
Grades 9–11—Systematic course on history of the U.S.S.R. and current events in the U.S.S.R. and abroad.

The program is designed to develop a "conscious acceptance of the scientific law of the inevitability of the downfall of capitalism and the victory of communism." [24] New textbooks and syllabi are being prepared along these lines. The prereform program in history included: introduction to Russian/Soviet history (grade 4); ancient history (grades 5–6); medieval history (grades 6–7); modern history (grades 8–10).[25] The method of teaching history is sequential and parallel, i.e., the same period is covered for different countries. The content of Soviet history courses is slanted toward political indoctrination and historical events are presented so as to conform to the communist dogma and the Soviet political attitude. There is apparently not much change in the overall requirements of the history program, but substantial revisions are being made in the course contents.

Foreign language.—A separate section is devoted to this subject below.

Geography.—Instruction begins with physical geography in grade 5, the main emphasis being on the U.S.S.R. In grades 6 and 7, physical, political and elementary economic geography is taught; and in grade 8, the geography of the U.S.S.R. No geography is taught in grade 9, but in grades 10 and 11 respectively the economic geography of the U.S.S.R. and of foreign countries is offered, with heavy political bias again in evidence.

Mathematics.—A systematic course in arithmetic is given in grade 5 and the first half of grade 6. Algebra [26] and geometry start in grade 6 and continue through grade 11.[27] Algebra instruction formerly went as far as binomials, permutations, and inequalities and introduced complex numbers. The new programs will also teach functions and derivatives in the 11th grade. As in the past, geometry will include solid geometry and introductory analytical geometry. Trigonometry, formerly taught in grades 9–10, went as far as inverse functions and trigonometric equations. It is intended in the new program that applied trigonometry be shifted to geometry courses and trigonometric

[22] For a concise analysis, see F. Lilge, "The Study of Literature in the Soviet School," in: U.S. Department of Health, Education and Welfare, Office of Education, *Teaching in the Social Sciences and Humanities in the U.S.S.R.*, Studies in Comparative Education series, Washington, D.C.: U.S. Government Printing Office, Dec. 1959, pp. 31–41.

[23] *Uchitel'skaia gazeta*, Nov. 3, 1959.

[24] *Idem.*

[25] See W. K. Medlin, "Analyses of Soviet History Textbooks Used in the Ten-Year School," in: U.S. Department of Health, Education and Welfare, Office of Education, *Teaching in the Social Sciences . . .*, pp. 1–18; and by the same author, "The Teaching of History in Soviet Schools," in Bereday and Pennar, *op. cit.*, pp. 100–116.

[26] For a most thorough evaluation of the algebra courses and syllabi for 1956, see Korol, *Soviet Education*, pp. 423–438.

[27] For mathematics syllabi, see Medlin, Lindquist and Schmitt, *op. cit.*, pp. 73–76; and Korol, *Soviet Education*, pp. 85–90.

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functions to algebra and be given in grades 10–11.[28]

Biology.—Introductory biology is covered briefly in the elementary grades in nature studies. Systematic courses in biology are given in grades 5–9, both in the old and the new curriculum.[29] The course includes botany, zoology, anatomy, human physiology, and the principles of Darwinism. In the new curriculum, the 9th grade course will be intensified to include a systematic course on biology of which the present course on the principles of Darwinism will become a part.

Physics.—Physics is introduced in the 4th grade in the course on nature studies. The systematic course on physics itself begins in the 6th grade and continues through the 11th. There are two stages in teaching physics, one for grades 6–8 in which elementary treatment is given to statics, mechanics, heat, acoustics, optics, electricity and the rudiments of atomic physics. The second stage, for grades 9–11, covers the same material in greater detail and uses basic concepts, laws, and formulas with relevant computations and laboratory experiments. In both stages the emphasis is on classical physics. The original 10th grade course in astronomy will be shifted to the 11th grade and it combines descriptive and observational approaches. In the new curriculum the applications of mathematics and physics will be extended to polytechnical subjects.

Chemistry.—In the new program, chemistry will be taught over a 5-year period instead of 4 as in the past. The emphasis is on inorganic chemistry, but the elements of organic chemistry are also taught. The aims of the chemistry course are: (1) A systematic knowledge of the elements and of the most important chemical compounds; (2) development of powers of observation; (3) understanding the simple chemical processes in nature and industry; (4) carrying through simple experiments; and (5) development of the ability to express chemical reactions and processes in a symbolic way.[30]

Activity subjects.—Physical education (gymnastics, athletics, etc.) is required in all grades. Organized sports are not stressed. Choral singing and music, which were originally included in only the elementary grade curriculum, have now been added to the curriculum for all grades.

Manual training.—In the elementary grades, modeling and work with paper and wood are considered workshop activities. Drawing is required in grades 1–7, and drafting of an elementary nature is required in grades 7–8. Manual training is given in grades 7–8 also. In the new program 8th grade girls will be required to take cooking and sewing. These activities are supplemented by "socially useful labor"—maintenance, gardening around the school, collecting scrap, or working in the fields.

Polytechnical and specialized instruction.—In grades 9–11 a basic course on production fundamentals is given, with either an agricultural or industrial profile. In both cases, physics, biology, chemistry and mathematics are applied to the instruction (and vice versa). In grade 9 the course on production fundamentals has about 14 different options—industrial enterprise, machine building plant, electric powerplant, railroads, construction techniques, agricultural products, etc. The student selects only one of these options and receives both theoretical and practical instruction, the latter including on-the-job experience. Each option requires 232 instruction hours. In grades 9, 10 and 11 an additional 1,124 hours must be spent preparing for a specific trade skill within any given area of production activity (such as metalworker, carpenter, mason, forester, clerical worker, etc.). Finally, optional courses on car maintenance, driver education, clothes design, electrical appliances, radio repairing, agricultural machinery maintenance, techniques of animal breeding, etc. may also be taken. These courses require 226 instruction hours.

Summary.—In the new 11-year school the Soviet student must take a standard set of academic subjects, with language and literature and mathematics being taught in all grades. History and geography begin in grades 4 and 5 respectively and continue through grade 11. Science courses are introduced gradually beginning in grade 4 and continue through grade 11. Activity subjects—physical education and

[28] *New York Times*, Dec. 20, 1959.

[29] For a general survey of science courses, see E. S. Obourn, "Science and Mathematics in the Soviet Ten-Year School," *School Science and Mathematics*, vol. 58 (October 1958), 514–517.

[30] For a detailed discussion of chemistry courses, see G. Siemiencow, "Teaching of Chemistry in Soviet Secondary Schools," *Proceedings of the Pennsylvania Academy of Science*, vol. XXXIII (1959), 106–119.

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music—are required in all grades. Manual training is required in both the elementary grades and in grades 5–8. As in the past, there are no electives as far as academic, activity or manual training subjects are concerned. The only option the student may exercise is in grades 8–11, when he may select one of a number of alternatives in the fundamentals of production and specific trade skill training.

4. *Native Language Schools*

While Soviet schools theoretically have a uniform curriculum, national and linguistic peculiarities continue to exist despite the drive toward Russification, and there are still a number of schools in which the instruction program is given in a language other than Russian. In the 1920's and early 1930's, some subjects in Soviet primary and secondary schools were taught in two languages—Russian and the language native to the republic. In terms of language learning, the experiment proved a failure. Since the mid-1930's there has been one chief language of instruction. Schools may carry on instruction in the native language, but all subjects are taught in that language; Russian is taught separately as a required supplementary language. There are also Russian language schools in which the native tongue is the supplementary language; and in these, study of the native language is required as a separate subject. A similar procedure is also followed in schools conducting instruction in a Western language, such as English or German (in Moscow and certain other large cities), or in an exotic language, such as Hindi or Chinese (in Central Asia).

Official Soviet data indicate that in 1955–56 about two-thirds of the primary and secondary school pupils attended Russian language schools where all subjects were taught in Russian, and the remainder took instruction in the official national language of the geographic locality in which the school operated. The data in table II–9 reveal that in all but three union republics, one-fifth or more of all pupils attended Russian language schools. In the Russian SFSR only 6 percent of the pupils attended schools conducting instruction in languages other than Russian. This is most striking. Other data reveal that in the Russian Federation, which is noted for a multiplicity of minor nationalities, instruction in the Russian language dominated entirely, even in territories where people of these nationalities resided.[31]

TABLE II–9.—*Proportion of pupils studying in Russian language schools, by union republic, as of 1955–56*

Republic	*Percentage of pupils in Russian language schools*
U.S.S.R. (total)	65
Russian SFSR	94
Ukrainian SSR	26
Belorussian SSR	22
Uzbek SSR	20
Kazakh SSR	66
Georgian SSR	20
Azerbaidzhan SSR	23
Lithuanian SSR	11
Moldav SSR	33
Latvian SSR	33
Kirgiz SSR	49
Tadzhik SSR	16
Armenian SSR	9
Turkmen SSR	21
Estonian SSR	22

Source: *KS–1956*, pp. 186–187.

In designing a national uniform curriculum, allowance must be made for about 35 percent of all Soviet pupils who attend schools conducting instruction in a language other than Russian. This is exemplified by the data in tables II–10, and II–11, which compare the 1960 curriculum offered in Russian and Uzbek language schools for the 8-year and upper secondary (grades 9–11) schools.

The comparisons show that the instruction time allocated to the majority of subjects, mathematics and the sciences in particular, is identical in the two curricula. The 8-year schools conducting instruction in the Uzbek language require 480 (or 5 percent) more instruction hours than Russian language schools, with fewer hours devoted to literature, foreign language, drawing, and singing (and the Russian language), but almost four times as many hours

[31] *KS–RSFSR–1958*, pp. 206–209. The percentage of pupils studying in Russian language schools as of 1956–57 was as follows: in autonomous national republics of: Bashkir—65; Buriat-Mongol—88; Dagestan—61; Kabardino-Balkar—76; Komi—76; Mari—71; Mordvin—77; North-Ossettin—81; Tatar—63; Udmur—85; Chuvash—56; Iakut—55. In autonomous national regions: Adugei—89; Altai Mountains—85; Khakass—94; Cherkess Karachai—91. In national districts: Aga (Buriat-Mongolia)—68; Komi-Permiak—71; Koriak—87; Evenki—98; Iamal-Nenets—96.

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TABLE II–10.—*Comparison of 1960 curriculum in 8-year schools of the Uzbek SSR, Russian and Uzbek language of instruction*

Subjects	Number of instruction hours in—	
	Russian schools	Uzbek schools
Russian language	2,164	*1,453
Literature	357	*340
Uzbek language	426	*1,796
Foreign language	465	*394
History-Constitution	426	426
Mathematics	1,663	1,663
Nature studies	105	105
Geography	303	303
Physics	249	249
Chemistry	142	142
Biology	304	304
Drafting	71	71
Drawing	248	*212
Singing	283	*247
Physical education	566	566
Manual training	566	566
"Socially useful" labor	426	426
Production experience	180	180
Total	8,964	*9,444

*Different from Russian schools.
Source: *Pravda vostoka*, July 5, 1960.

TABLE II–11.—*Comparison of 1960 curriculum in 3-year urban secondary schools (grades 9–11) of the Uzbek SSR, Russian and Uzbek language of instruction*

Subjects	Number of instruction hours in—	
	Russian schools	Uzbek schools
Russian literature	339	339
Uzbek language	226	*none
Russian language	none	*339
Mathematics	452	452
History	335	335
Constitution	70	*54
Economic geography	148	*129
Physics	382	382
Astronomy	39	39
Chemistry	265	265
Biology	117	*101
Drawing	78	*55
Foreign language	261	*226
Physical education	226	226
Production skill training	1,130	*1,126
Optional courses	226	226
Total	4,294	4,294

*Different from Russian schools.
Source: *Pravda vostoka*, July 5, 1960.

devoted to the Uzbek language as in the Russian schools.

In the upper secondary school, the total number of instruction hours is the same, but in the Uzbek schools fewer hours are devoted to study of the Constitution, economic geography, biology, drawing, foreign language and production skill training (and none to the Uzbek language), while students still are required to take 339 hours of instruction in the Russian language (with no such instruction required in Russian language schools).

We note also that the number of hours required for Uzbek language study in Russian language schools is much less (grades 1–8—426; grades 9–11—226; total—652) than for the Russian language in Uzbek schools (grades 1–8—1,453; grades 9–11—339; total —1,792). This process of Russification through education is furthered in the Uzbek republic—as in many other regions—by the use of the Cyrillic alphabet. "Education," it is said, "has made spectacular gains since the Uzbek language was converted to the Russian alphabet." [82]

One of the benefits of the educational reforms was supposed to be the elimination of "inequality" between Russian language and native language schools. The latter schools had less instruction in certain other subjects partly because the students were required to learn their native language and literature. The new curriculum reduces but does not entirely eliminate the disparity in the required number of instruction hours in basic subjects.[83]

Whereas in the past, the requirement that pupils attending native language schools take instruction in the native language was compulsory, the educational reform abolished this requirement and parents are now "free to choose" the language of instruction their children take.[84] The native language thus becomes merely an instruction subject rather than the language in which all instruction is conducted. Further information is not available, but it would seem likely that most parents would choose Russian, the U.S.S.R.'s official language, as the language of instruction for their children.

[82] *Pravda vostoka*, Oct. 19, 1957.
[83] *Pravda*, Aug. 26, 1959.
[84] This is also true, of course, for the Uzbek schools treated above. *Pravda vostoka*, July 5, 1960.

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5. *Foreign Language Instruction*

Almost all pupils in Soviet junior and senior secondary schools take one foreign language as a required subject of instruction.[35] Instruction begins in the 5th grade, when the normal age of pupils is 12, and continues for 7 years (6 in the old curriculum). Changes in the number of hours devoted to instruction in one foreign language over the past few years are as follows:

TABLE II–12.—*Number of instruction hours devoted to foreign languages in the Soviet school curriculum, 1947–63*

Year	Number of foreign language instruction hours	Percentage of total curricular instruction	Grades involved
1947.....	743	7.8	5–10
1952.....	726	7.5	5–10
1955.....	660	6.7	5–10
1957.....	680	6.5	5–10
1959–63.....	726	5.6	5–11

Source: Appendix tables II–B–1 through II–B–5.

Soviet educational sources invariably point out with pride that the teaching of foreign language is standard practice in almost all Soviet schools.[36] Tradition in this field goes back to pre-Revolutionary schools, where two foreign languages, plus Latin (and sometimes Greek) were required.[37]

With regard to foreign language instruction in the secondary grades, the 1957 curriculum specified that in grades 5–7 a total of 374 instruction hours were to be spent on foreign language, with emphasis on pronunciation, reading and writing on an elementary level. This was to be followed by another 306 hours of instruction in grades 8–10, where the emphasis was on grammar, reading, translating and elementary composition. Altogether, then, six academic years and 680 instruction hours were devoted to foreign language instruction. This amounted to 6.5 percent of total curricular hours in the former 10-year school.

From table II–12 it can be seen that both the total number and the proportion of hours devoted to foreign languages declined between 1947 and 1955 as the curriculum adjusted to polytechnical education. The trend in terms of hours was reversed in 1957, but the proportion of time in the total curriculum devoted to foreign languages continued to decline. In the course of the debate on the educational reform, it was first suggested that in grades 5–8, hours devoted to foreign language instruction be reduced and that part of the program of foreign language instruction be made elective in the 11-year school. Instead, however, the planned curriculum for 1959–63 increased the instruction time allotted to foreign language by 40 hours, although this represented a further decline in terms of percentage of overall instruction time for all courses.

It has been widely but erroneously reported in the West that English is the major foreign language taught in Soviet schools. One American report, for example, has stated that among 15 million pupils, "45 percent are studying English, 35 percent German and 20 percent French, according to an authoritative source." [38] Similarly, another American report notes that "of all foreign languages, English is the most widely taught in the Soviet Union," [39] and cites the same percentages. The earlier report by the same office also indicated that English ranked first among foreign languages studied in the Soviet schools.[40] These reports notwithstanding, recent statistical data published in primary Soviet sources [41] indicate German to be the most popular foreign language. In second place, English in 1958–59 was offered by one-third

[35] That foreign languages are not taught in some schools is confirmed by the 1959 rules of admission for higher educational establishments. These rules specify that candidates whose secondary school transcripts show no record of foreign language study need not take the foreign language test in the entrance examination. (Appendix IV–AR, especially notes 3–5 to par. III.)

[36] The Russian language in native language schools and the native language in Russian language schools are not regarded as foreign languages. Thus, as a rule, in all bilingual schools, the pupils learn the Russian language, their native language, plus a foreign language. As indicated above, however, the number of instruction hours devoted to foreign language is less in native language than Russian language schools.

[37] *Medynskii–1955*, p. 85.

[38] U.S. Congress, *The Federal Government's Foreign Training Programs*, Report of the Committee on Government Operations, Sub-committee on Reorganization and International Organizations, No. 153, 86th Cong., 1st sess., Washington, D.C.: U.S. Government Printing Office, 1959, p. iii. See also the discussion on pp. 11–15.

[39] Office of Education, *Soviet Commitment to Education*, p. 35.

[40] *OE–U.S.S.R.*, p. 74.

[41] Especially *KS–1956*, p. 180; *Vestnik statistiki*, No. 9, 1958, p. 95; *NarKhoz–1959*, p. 819; *NarKhoz–1960*, p. 731.

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fewer schools than German, studied by half as many students, and taught by half as many teachers. (See table II–13.)

The predominance of German is simply a continuation of the pre-Revolutionary preference for German and French language study. Before the Second World War, strategic considerations, added to the traditional preference, resulted in German becoming virtually the only foreign language taught in Soviet secondary schools. It was regarded as the technical language of the world. French, on the other hand, was regarded contemptuously as a "bourgeois" survival, since it was affected by a majority of the well-to-do before the Revolution. When offered, English was studied because it was a useful adjunct to the study of science and technology.

Just before and particularly during the war, the teaching of English was intensified. The teaching of French was introduced in 1947 with plans for instruction in 20 percent of urban schools; yet even today French is "avoided by school administrators." [42] Not until 1955 was instruction in Spanish initiated, and "exotic" languages were offered for the first time in 1956.[43] Although English has gained considerably in the postwar years, it is not likely to replace German as the first-ranking foreign language in Soviet schools for another decade or two.

[42] *Uchitel'skaia gazeta*, Aug. 20, 1959.

[43] U.S. Dept. of State, OIRA, "Soviet Language and Area Programs for Asia and Africa," *Intelligence Report*, No. 7783, Washington, D.C., Aug. 5, 1958, p. 3. Only a dozen or so schools have been experimenting with instruction in such exotic languages as Hindi, Urdu, Chinese and Arabic.

At the end of 1958, some 78,000 [44] 7-year and 10-year schools offered a total of 92,830 foreign language courses, which means that some schools offered more than one foreign language. In the fall of 1958 the total number of pupils taking one or more foreign languages was 11,186,000, or 95 percent of all pupils enrolled in grades 5–10.

The figures in table II–13 indicate that in 1958, English accounted for about one-fifth of all foreign language courses offered, and that about one-third of all students were studying English. German, meanwhile, was first in preference, with over two-thirds of all foreign language courses offered and about the same proportion of total enrollment. Only 8 percent of the foreign language courses were French; a negligible proportion was left for other languages. It should be noted that despite the decline in the total number of foreign language courses and enrollment in 1958, caused by the drop in upper-grade enrollment in general, the number of courses in English and enrollment in them increased somewhat.

Table II–14 shows a close correlation between the number of foreign language teachers in Soviet secondary schools and the number of language courses and volume of enrollments as shown in preceding table II–13. The number of teachers of languages other than the three specified in the tables is unknown. It is significant to note that during the four-year period between 1955 and 1959, the number of German teachers declined by about 10,000, although they

[44] *NarKhoz–1959*, p. 816.

TABLE II–13.—*Offerings of foreign languages in grades 5–10 of Soviet 7- and 10-year schools, year end 1956 and 1958*

Foreign language	Number of offerings				Number of pupils enrolled			
	1956–57		1958–59		1956–57		1958–59	
	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent
German	66.2	70.5	64.6	69.6	7,651	64.0	6,758	60.5
English	19.3	20.5	20.6	22.2	3,306	27.6	3,518	31.3
French	8.3	8.9	7.6	8.1	1,004	8.4	907	8.2
Other (unspecified)	.1	.1	.03	.1	2	negl.	3	negl.
Total	93.9	100.0	92.83	100.0	11,963	100.0	11,186	100.0

Sources: For 1956: *Vestnik statistiki*, No. 9, 1958, p. 95; for 1958: *NarKhoz–1959*, p. 816, and *NarKhoz–1960*, p. 731.

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TABLE II–14.—*Foreign language teachers in Soviet 7- and 10-year schools*

Language	Number of teachers in grades 5 to 7	Number of teachers in grades 8 to 10	Total number	Percent	Percent of total with completed higher education
1955–56:					
German..	40,031	18,584	58,615	66.0	27.8
English..	13,091	9,090	22,181	25.0	71.4
French..	4,713	3,341	8,054	9.0	68.1
Total..	57,835	31,015	88,850	100.0	.....
1958–59:					
German..	33,000	16,000	49,000	59.7	.....
English..	16,000	10,000	26,000	31.7	.....
French..	4,000	3,000	7,000	8.6	.....
Total..	53,000	29,000	82,000	100.0	.....
1959–60:					
German..	35,000	14,000	49,000	58.4	.....
English..	18,000	9,000	27,000	32.1	.....
French..	5,000	3,000	8,000	9.5	.....
Total..	58,000	26,000	84,000	100.0	.....

Sources: *KS–1956*, pp. 180–181; *NarKhoz–1959*, p. 819; *NarKhoz–1960*, p. 734.

continued to outnumber English teachers almost two to one. Between 1955 and 1959 the number of English teachers increased by about 5,000.

It is also interesting to observe that in 1955–56, for which data on teacher qualifications are available, most English and French teachers (71.4 and 68.1 percent respectively) had completed higher education, while only about a quarter of the German teachers had comparable qualifications. This suggests the possibility that German may be the mother tongue of a high proportion of German teachers, who may be recruited from the large minority of Germans living in the U.S.S.R. (1959—1,616,000).

Some Western observers consider foreign language training in Soviet secondary schools to be on a par with that in American high schools.[45] Other appraisals indicate that the method of language instruction may be inefficient.[46] The "grammar-translation" approach does not impart facility in the use of a language comparable to that frequently attained through the use of oral-audial and audio-visual techniques. Average language achievement is admitted by Soviet pedagogues to be exceedingly poor.[47] Public criticism is not unusual; the pages of the journal *Inostrannye iazyki v shkole* (Foreign Languages in School) contain literally hundreds of direct references to instructional deficiencies. This evaluation is supported by an American educator who observed an attitude of "dullness" prevailing in the advanced language classes of Soviet schools he visited.[48]

In an effort to overcome these deficiencies, the Soviet authorities in recent years have inaugurated special language schools in which instruction in some subjects such as geography and literature is conducted in English, German, or French. According to one of the best eyewitness observations of an English school in Moscow,[49] where one-fifth of the total instruction is conducted in English,[50] this effort shows moderate signs of success. At the present time there are in the Soviet Union some 20 of these experimental secondary schools conducting part of their instruction in a foreign language. Another dozen such schools were scheduled to be set up in the winter of 1959-60 in various provincial cities.[51]

One of the handicaps of the Soviet language program, of course, is that the majority of the teachers have no opportunity to improve their speech through study abroad.[52] The active vocabularly of 3,600 to 4,300 words and "passive" vocabulary of about 8,000 words acquired through formal study by Soviet language teachers [53] is inadequate for proper instruction in a living language. Thus, in the words of the American observer mentioned above, "because of too large classes and too didactic method, the many hours spent by Russian children learning a foreign language yield on the whole medi-

[45] Office of Education, *Soviet Commitment to Education*, p. 34.

[46] E.g., see J. Ornstein, "Foreign Language Training in the Soviet Union—A Qualitative View," *The Modern Language Journal*, vol. XLII, No. 8 (December 1958), 382–392; Bereday, Brickman and Read, *op. cit.*, ch. IX.

[47] See, e.g., A. D. Kuzina, "Povysit' kachestvo prepodavaniia inostrannykh iazykov v shkole (k itogam ekzamenov v VUZ'y v 1957 godu)" (Toward Improving the Teaching of Foreign Languages in Schools [The Results of Entrance Examinations into Higher Educational Establishments in 1957], *Sovetskaia pedagogika*, No. 3, 1958, 35–103. This article indicates that the Soviet program of secondary-school language instruction is very poor indeed. See also Bereday and Pennar, *op. cit.*, pp. 117–131.

[48] M. A. Abell, "Foreign Language Teaching in the U.S.S.R.," *The Modern Language Journal*, vol. XLIII, No. 2 (February 1959), 74.

[49] Moscow School No. I, a showplace to which practically every American educator on tour of the U.S.S.R. is taken.

[50] F. Parker, "The Teaching of English in a Soviet Middle School," *The Modern Language Journal*, XLI (May 1957), 229–233.

[51] *Narodnoe obrazovanie*, No. 12, December 1959, p. 127.

[52] Ornstein, *op. cit.*, 392.

[53] Abell, *op. cit.*, 76.

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core results." [54] Notwithstanding this judgment, it should not be overlooked that the Soviet Union is determined to improve the quality of language instruction. In quantitative terms, the Soviet system undoubtedly has the advantage of "exposing" large numbers of children to one or more foreign languages at an early age. Some eventually turn to specialized instruction, which on the higher education level often results in the training of competent interpreters and translators who make a most favorable impression upon visitors to the Soviet Union.

6. *The Soviet Pupil in a Squeeze*

The demands made upon Soviet students are excessive. Ever since the restoration of traditionalist schooling in the mid 1930's, there has been constant talk about easing this burden. The earliest move toward relief was a decree of the Central Committee of the Communist Party in 1934, which directed that students should not be overburdened with social and political chores.[55] In 1948 and 1949 it was again decreed that sociopolitical tasks were not to be so excessive as to result in classroom absences and insufficient time for homework.[56] In 1951 "excessive" homework assignments came under attack,[57] and the following "maximum norms" for daily home assignments were established: Grade 1—not to exceed 1 hour; grade 2—1.5 hours; grades 3–4–2 hours; grades 5–6–3 hours; grade 7—3.5 hours; grades 8–10—4 hours. In 1954 home assignments for pupils in grades 1–3 were prohibited.[58]

Student "overburdening" came under forceful attack again in 1955 and 1956. Prominent Soviet medical authorities claimed that the health of school children was on the point of danger.[59] As a result, programs were revised and examination requirements were reduced. But despite these measures and promises, burdensome "extracurricular and sociopolitical activities," excessive weekly "instruction loads" and long hours of homework still continued.[60] In effect, the vocational requirements introduced into the curriculum placed an even greater burden on the pupils than before. In 1958 the Soviet student was as "overburdened" as ever. The "workday," for example, of a student in the upper grades (8-10) lasted "ten and frequently twelve hours." [61] Five to six hours daily were spent in the classroom, and 3.5 to 4 hours on homework. On industrial training days, 2 to 3 hours more were added. As many as 2 more hours were added on the days with extracurricular activities or obligatory meetings of "social organizations" such as the Young Communist League or Pioneer organization.

In the course of the debate on educational reform, many reports appeared in the press urging that the new programs put an end to this practice of overloading. One such report described it as "the greatest evil of contemporary schooling." [62] Meanwhile, homework assignments for all grades were prohibited over Sundays and holidays.[63] In an educational reform memorandum Khrushchev himself expressed the thought that "the overburdening of pupils, which has ill effects upon their health, should not be allowed." [64] However, the new school curriculum which has been put into effect under the reform program does nothing to diminish this burden.[65] The summer vacation has been shortened, and the weekly load increased in all grades. The required alternation of work and study periods has not been observed; in fact, more homework is required than ever. One of the chief inspectors of school hygiene of the Ministry of Public Health of the U.S.S.R. has estimated that time devoted daily to classroom instruction, homework, production experience and socially useful work to be 7 to 8 hours for students in the elementary grades (1-4), 8 to 10 hours for students in the intermediate grades (5-8), and 12 to 14 hours for students in the upper grades (9-11).[66] This does not include extracurricular activities and sociopolitical work

[54] *Ibid.*, 78.
[55] Deineko, *Spravochnik*, p. 34.
[56] *Ibid.*, pp. 223–226. See also *Uchitel'skaia gazeta*, Dec. 23, 1948.
[57] Deineko, *Spravochnik*, pp. 236–239.
[58] *Ibid.*, p. 245.
[59] *Literaturnaia gazeta*, May 10, 1956. Similar stories appeared in the local press (e.g., *Sovetskaia Latvia*, Nov. 3, 1956).
[60] *Sovetskaia Latvia*, Feb. 27, Mar. 29, 1957; *Uchitel'skaia gazeta*, Dec. 3, 1957.
[61] *Uchitel'skaia gazeta*, May 20, 1958.
[62] *Kommunist* (Armenia), Dec. 9, 1958.
[63] *Uchitel'skaia gazeta*, Nov. 26, 1958.
[64] *Pravda*, Sept. 21, 1958.
[65] *Uchitel'skaia gazeta*, July 9, 1959. The new Soviet curriculum is said to be designed for the "ideal teacher and the ideal student" (*ibid.*, July 13, 1959).
[66] *Meditsynskii rabotnik*, July 17, 1959.

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in such organizations as the Pioneers or Komsomol. The official was constrained to advise: "We should take care of the health of our children" and "from the point of view of normal physical development and child hygiene, the curricular proposal requires serious amendments." [67] The architects of the new curriculum —the Ministry of Education of the RSFSR and its Academy of Pedagogical Sciences—have failed (as of 1961), to make any such amendments. Indeed, they cannot make such changes and still fulfill all the demands made on the schools by the communist planners.

7. *Textbooks*

Only texts which have been approved by the republic Ministries of Education may be used.[68] The student must purchase his own textbooks, either new or used, at the beginning of each school year. Whenever the curriculum is revised substantially, as was the case after the educational reform law was passed, there is obviously a need for thorough textbook revision as well.[69] A number of new texts are printed annually, but there are some which still are in use after years, or even decades, without change.[70] Although it is claimed that the shortage of textbooks has eased in recent years, it is apparently still a problem to get the new textbooks published on schedule.[71]

In general, textbooks use a "lesson-unit" approach, with sectional divisions corresponding to the syllabi requirements. They contain detailed exercise instructions and other directions intended to support the standardized instruction process and to allow for close adherence to the curricular requirements.

8. *Some Qualitative Determinants of the Educational Process*

The term "quality of education" cannot be defined with precision. First, it is a relative concept. Second, it is an aggregation of observations to which specific weights cannot be assigned. One of the observable and measurable determinants of the quality of education is the curriculum discussed above. Another, which will be discussed now, is the set of measures built into the entire educational process in order to enforce its standards.

The major purpose of the Soviet educational process is to develop in the student a "mastery of a given amount of knowledge." [72] The imparting of such knowledge is based on the "lesson unit." [73] Each class period lasts 45 minutes, 10 to 12 minutes of which are spent checking the homework, 22 to 25 minutes explaining new material, and 7 to 10 minutes on review and assigning new homework.[74]

In addition to the strict scheduling of the instruction process, there are detailed regulations concerning the student's entire day,[75] and the ideal schedule is laid out—alternating periods of study and rest, the proper amount of time to be devoted to homework, exercise, sleeping, etc., and the parents are urged to have their children adhere to the ideal schedule. The educational process, it is believed, is best conducted in an atmosphere of orderly and disciplined activity. Not all Soviet authorities agree, apparently, and the strict scheduling has been criticized for stifling "the maximum development of independent self-expression . . . and a conscious understanding of the materials learned." [76]

A 5-point grading system is used in Soviet schools, the grade of 1 being failing and 5, excellent.[77] Many regulations regarding grading are issued by the various Ministries of Edu-

[67] *Idem.*

[68] A list of the textbooks used in 1958–59 is presented in the supplement to appendix table II–B–3.

[69] Soviet sources estimate that in the 4-year period 1959–62 34 textbooks must be revised and 65 new ones prepared. *Sovetskaia Rossiia*, July 11, 1959.

[70] Korol, *Soviet Education*, pp. 71–75.

[71] See various issues of *Uchitel'skaia gazeta* during August and September of almost any year.

[73] Akademiia Pedagogicheskikh Nauk RSFSR, *Razvitie logicheskogo myshleniia v protsesse obucheniia v nachal'noi shkole* (Development of Logical Thought in the Process of Education in the Elementary School), Moscow, 1956, p. 3.

[73] *ASP–NarObr–1957*, p. 121.

[74] D. O. Lordkinanidze, *Printsipy, organizatsiia i metody obucheniia* (Principles, Organization and Methods of Instruction), Tiflis, 1955, pp. 127–128. The instructions to the teacher for planning each class period during the entire course are meticulous. See N. V. Arkhangel'skaia and M. S. Nakhimova, *Plany urokov po arifmetike vo vtorom klasse* (Planning of Class Instruction in Arithmetic in the Second Grade), Moscow, 1958.

[75] M. V. Antropova, *Organizatsiia rezhima dnia shkol'nika* (Organization of the Pupil's Day Schedule), Moscow, 1955, especially p. 57.

[76] *Uchitel'skaia gazeta*, Nov. 17, 1956. For a similar criticism, see APN RSFSR, *Razvitie logicheskogo myshleniia . . .*, p. 3.

[77] See Deineko, *Spravochnik*, pp. 247–248.

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cation.[78] That the grading regulations are not always strictly observed is evidenced by an editorial in a Soviet newspaper:

> We must not conceal it. Teachers frequently give passing grades regardless of whether they correspond to the pupil's real knowledge. It is difficult to say what prompts teachers to do this. Perhaps it is pity or a desire to help [the pupil] be promoted to the next grade. But it may also be due to [the teacher's] desire to show a higher average grade for the class or for a certain subject. . . .[79]

Despite a continuing campaign against "fallacious grading," [80] it is still said that by paying so much attention to the formal indicators of academic performance and discipline, the teachers and the parents are at fault for overlooking other latent symptoms of "distintegrating personality traits." [81] Because Soviet higher educational establishments have, until recently, exempted students with an excellent record from entrance examinations (and the secondary school record is still an important factor in admission), Soviet students have long had a competitive attitude toward grades. Students are not promoted unless they have at least passing grades (i.e., 3 or higher) in every subject, and "grade-chasing" is motivated by the pupil's understanding of the *need* to do well.

Until 1956, promotion was determined primarily by scores on the final examinations held each year from the 4th grade on. In 1956 the promotion examinations in grades 4–6 and 8 and 9 were abolished,[82] and the pupil's cumulative grade over the school year determined whether or not he was promoted. Final examinations after grades 7 and 10 were retained, and in the new school program they will be held following the completion of grades 8 and 11.

The final examinations at the end of grade 10 (or 11) determine whether the student is eligible for a distinction certificate. In 1959 a new regulation concerning the award of these certificates was issued,[83] stipulating that beginning in 1960 "gold medalist" certificates would be awarded to those receiving all excellent grades in the final examinations, as well as excellent marks in discipline and in "production education and employment." "Silver medalist" certificates would be awarded if two of the grades were "good" (i.e., 4) and the others excellent.

As in the past,[84] the final examinations are both oral and written, and cover the entire school program in five subjects: (1) Russian language and literature; (2) mathematics; (3) physics; (4) chemistry; and (5) history. For the other subjects, the cumulative grade is entered on the graduation certificate. A sample set of questions is published several months prior to the date of the final examinations by the various Ministries of Education. The entire range of topics is covered, although the student does not of course know which of the questions will be asked, or, in the case of the mathematics, physics, and chemistry examinations, what specific problems will be assigned. At the time of the examination, a ticket containing a set of 3 to 5 questions is drawn at random from a group of other questions,[85] which have been prescribed by the individual Ministries of Education.

Politics, Atheism and Moral Education

Soviet practices of linking science education with atheistic upbringing, and moral education with political indoctrination, are claimed by Soviet pedagogues to express Marxist concepts of education. They do not, however, correspond to the utterances of Karl Marx, who, almost a century ago, during the discussion on education in the General Council of the First International, declared:

> Political economy and religion ought not to be taught in the lower grade schools or even in the higher ones; that is a kind of education which must rest with the adult; instruction in these fields should be given in the lecture hall, not in the school. Only the natural sciences, only truths which are inde-

[78] "Interesting" queries may arise in regard to the regulations. For example, how can a student get a terminal grade of 5 on his graduation certificate when his previous grades have not been higher than 4? (*Uchitel'skaia gazeta*, Apr. 29, 1958.) Teachers are accused of these liberal tactics in order not to spoil a good student's chance to get a distinction medal.

[79] *Uchitel'skaia gazeta*, May 20, 1958.

[80] *Pravda*, Nov. 16, 1959.

[81] N. A. Levitov, *Detskaia i pedagogicheskaia psikhologiia* (Child and Pedagogical Psychology), Moscow, 1958, p. 29.

[82] *Uchitel'skaia gazeta*, Nov. 3, 1956; *Kommunist* (Armenia), Oct. 9, 1956; *Sovetskaia Kirgiziia*, Sept. 21, 1956.

[83] *Izvestia*, Oct. 6, 1959.

[84] See Deineko, *Spravochnik*, pp. 139–143.

[85] The most complete description of the mechanics of the examination procedure is given in Office of Education, *Soviet Commitment to Education*, pp. 46–49.

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pendent of all party prejudices and permit only one interpretation should be taught in schools.[86]

Soviet schools have in fact long since rejected these precepts and have adopted Lenin's view of "Marxist" education as enunciated in 1918: "We openly declare that the school outside of life, outside of politics, is a lie and a hypocrisy." [87] While Marx did not even postulate a separate aspect of education devoted to "moral upbringing," Lenin sought to make education a tool of politics. "We should see to it," he declared, "that the entire business of education, upbringing and teaching of our youth consists of instilling in them the communist morality." [88] Accordingly, a major objective of Soviet education under Lenin, Stalin and Khrushchev has in fact been the inculcation of communist morality and ideology, contrary to the original Marxist precepts of education.

With education calculated to serve political ends, the central dilemma of education under communism has always been the inculcation of objective knowledge without jeopardizing the ideological, subjective political aims. In order to deal with this problem, education has been made primarily practical, applied and specialized. Among academic subjects, only the sciences and mathematics are relatively free from political bias. The course content in other subjects—languages, literature, history, geography, etc.—are shaped not only with the intention to impart objective knowledge, but also to instill the idea of the superiority of the communist system over any other. Values, beliefs, and the individual's view of life and society have been shaped within the desired ideological and political molds, but at the same time the individual has been permitted to accumulate objective knowledge for practical ends. This concern has put the natural sciences in the forefront, as an area of knowledge relatively invulnerable to the encroachments of subjectivity. Humanistic and social studies, meanwhile, have been rigidly contained within the framework of a dogmatic political credo; free academic inquiry in these areas has been strangled. In the natural sciences relative bounds have been established, often flexible but sometimes with a very rigid interpretation of primitive dialectics now a century outdated.

In Soviet schools today political bias permeates every subject of instruction. In Russian language courses, for example, students are asked to write an essay on "Labor in the U.S.S.R. and Capitalist Countries." [89] One of the problems in a second-grade arithmetic text reads: "Before the Great October Revolution workers used to work 12 hours per day; now they work only 8 hours per day. By how many hours has the working day been reduced since the Great October Revolution?" [90]

In history texts, students are informed that the American Constitution of 1787 "in effect curtailed the rights of workers," [91] or that, with the assassination of Abraham Lincoln, "the big bourgeoisie won and from then on established its dictatorship." [92] History and geography are probably the subjects which have most suffered from the impact of political bias. The interpretations presented, whether in school textbooks or in articles in the *Large Soviet Encyclopedia*,[93] are often nightmarish. But political bias, present everywhere, is particularly noticeable in foreign language courses. The English language textbook [94] makes reference on virtually every other page to misery, unemployment, exploitation, and racial discrimination in the United States, England, and other capitalist countries. Indeed, such is the image of capitalist America [95] projected by all Soviet mass media as "objective schooling."

[86] Quoted from the London *Beehive* of Aug. 21, 1869, in *Die Neue Zeit*, XII (1894), book II, 826, in *The Labour Revolution*, pp. 221–222, and in *Terrorismus und Kommunismus*, preface to the second German edition, p. 19.

[87] Lenin, *Sochineniia*, vol. 28, p. 68.

[88] *Ibid.*, vol. 31, p. 266.

[89] A. S. Bedniakov and A. S. Matiichenko, *Russkii iazyk (Chast' vtoraia)* (Russian Language [Second Part]), Moscow, 1954, p. 38.

[90] A. S. Pchelko and G. B. Poliak, *Arifmetika: Uchebnik dlia vtorogo klassa* (Arithmetic: Textbook for the Second Grade), Moscow, 1958, p. 23.

[91] A. V. Efimov, *Novaia istoriia: Uchebnik dlia 8-go klassa* (Modern History: Textbook for the 8th Grade), Moscow, 1940, p. 16. The 17th edition of this text was in use as late as 1959; see supplement to appendix table II–B–3.

[92] *Ibid.*, p. 83.

[93] *Bol'shaia Sovetskaia Entsiklopediia*, especially vol. II, pp. 223–267, vol. XXIX, pp. 557–654. In addition to the usual distortions, the United States is described as a "colonial power," and the name "America" is claimed to have been "usurped" by American imperialists in order to justify the "geopolitical monopoly of the U.S.A. over all the Americas."

[94] E. L. Belova and L. R. Todd, *English: Uchebnik angliiskogo iazyka dlia 8-go klassa srednei shkoly* (English: Textbook of the English Language for the 8th Grade of the Secondary School), Moscow, 1956, *passim*. This text has been used in Soviet schools for the last 20 years.

[95] See F. C. Barghoorn, *The Soviet Image of the United States*, New York: Harcourt, Brace & Co., 1950, especially p. 245 and *passim*.

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Until fairly recently, Soviet pedagogues could at least make the formal claim that there were no separate political indoctrination courses in the schools. *The Foundations of Marxism-Leninism,* however, a mammoth volume published in 1959, declared that the "new Soviet man" should become thoroughly knowledgeable in the foundations of "scientific communism."[96] In January 1960, a decree of the Central Committee of the Communist Party announced an important change concerning the tasks of party propaganda:

> With the reorganization of the system of public education, the mission of the secondary school and secondary specialized educational establishments to educate builders of a communist society has increased. Therefore the task of inculcating the communist outlook and a high moral conscience among secondary school students takes on particularly great significance. We must see to it that students, while mastering the subjects of instruction, acquire a materialistic outlook, learn communist ideology and understand the policy of the party so as to wage a struggle for its fulfillment. It is deemed necessary that starting with the academic year 1961–62 in the upper grades of the secondary school and the upper courses of secondary specialized educational establishments there shall be introduced a popular study course in the foundations of political knowledge. A special textbook is to be prepared for this subject of instruction.[97]

While original Marxist precepts have thus been abandoned with regard to keeping politics out of the schools, Soviet education continues to adhere to the Marxist view of religion as the "opiate of the people." Soviet ideology is based on the categorical assumption that science and religion are irreconcilable.[98] Any expression of religious belief or sentiment is viewed by the regime with contempt, for religion causes the "stagnation" of science and human welfare. In addition to implanting objective knowledge, science education in Soviet schools is used as a vehicle for atheistic indoctrination.[99]

Although Soviet authorities have sometimes claimed that they are "neutral" toward religion, that the Soviet Constitution guarantees the right of "religious worship, as well as the right of antireligious propaganda," this claim of "neutrality" is not borne out, at least as far as Soviet schools are concerned. The tasks of the Soviet school are geared explicitly to the atheistic orientation of pupils. By arranging, presenting, and even deliberately slanting the subject matter of instruction, the teacher makes sure that students "consciously" adopt a materialistic outlook and militant antireligious attitudes. Instructions adjure the teacher to prepare his course "so as to conduct antireligious education at all times."[1] The task of the school is particularly important because very little is done "even by most atheistic parents" to foster antireligious attitudes in the family.[2]

This "neutrality" of parents was attacked in the recent intensification of the antireligious campaign. Frequent articles in the press disparage religion.[3] Science is represented as "light," religion as "darkness."[4] Forced by the circumstances of World War II to relax somewhat its war against religion,[5] the Soviet regime has now renewed its campaign of antireligious propaganda.[6] In 1959, in fact, the Soviet Government announced the publication of a new antireligious monthly, *Nauka i religiia* (Science and Religion).

To promote antireligious propaganda, some Soviet universities (Kiev, for example) have opened permanent departments "on the history and theory of atheism."[7] These departments prepare and distribute antireligious pamphlets and present public lectures. All prospective teachers and philosophy and history students at universities and pedagogical institutes are required to take a special course in the history and theory of atheism. In like manner, the Academy of Sciences of the U.S.S.R. has set up

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[96] *Osnovy Marksizma-Leninizma,* Moscow, 1959, p. 711.

[97] *Pravda,* Jan. 10, 1960. The preparation of the new textbook has been delayed, however, for some unexplained reason (*Uchitel'skaia gazeta,* Apr. 4, 1961), and in the academic year 1961–62 the course on "Constitution of the USSR" will be given instead in the terminal grade (i.e., 10 or 11). The political fundamentals course will apparently begin to be offered in 1962–63.

[98] See "Contemporary Theosophy in Science," *Kommunist,* No. 13, Apr. 1959; *Pravda,* Feb. 17, 1960.

[99] A. U. Floridi, "Antireligious Education of Soviet Youth," in Bereday and Pennar, *op. cit.,* pp. 89–99.

[1] E. I. Petrovskii, *Ateisticheskoe vospitanie detei v shkole i sem'e* (Atheistic Upbringing in School and Family), Znanie Series, Moscow, 1955, p. 20.

[2] *Ibid.,* p. 30.

[3] *Uchitel'skaia gazeta,* Jan. 8, 1959; *Komsomol'skaia pravda,* Mar. 31, May 26, June 5, July 24, Sept. 2, 1959.

[4] *Pravda,* Aug. 4, 1959.

[5] A. Inkeles, "Family and Church in the Postwar U.S.S.R.," *The Annals of the American Academy of Political and Social Sciences,* May 1949, 33–44.

[6] *Literaturnaia gazeta,* Dec. 15, 1957.

[7] *Komsomol'skaia pravda,* Oct. 22, 1959.

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a Research Council on Atheism and Criticism of Religions, for which many prominent scientists have been recruited.[8] One of the tasks of this council is to direct the writing of school textbooks to ensure the "proper" antireligious content. The new assault on religion was heralded by Khrushchev's declaration that "our public education, our popularization of science, our study of the laws of nature should leave no room for faith in God." [9]

"Marxist" education, practiced wherever communists are in power, is said to be concerned with education in "communist morality." What, therefore, is "communist morality"? Lenin postulated that "morality outside of human society does not exist" [10] and consequently all propositions about natural morality and ethics based on religion are rejected. Obviously, therefore, in neither the context of religion nor especially of politics do Soviet children learn to distinguish right from wrong on the basis of truth and objective facts by means of which they can form opinions. No opportunity is lost to impregnate courses of study with falsehood and political bias in which light communism, as currently interpreted, will always seem right. Although the "cult of personality" of the Stalin era [11] has officially been denounced, Khrushchev today, cloaked in infallibility, imposes his policies as the restoration of the "true Leninist" line.

It is foolish to allege that communist morality and Soviet education are based on absolute moral foundations, and that pupils under communism can be taught "morality" as this word is understood in Western Judeo-Christian civilization. Communist morality is devoid of any ethical foundations and is entirely relativistic. The only "absolute moral category" which is recognized is discipline and obedience to the dictates of the leaders, who interpret the "truth" in whichever way suits their current objectives. The individual cannot make conscious distinction of right from wrong without recourse to political justification. In this sense, communist morality is not based on a set of consistent moral propositions. Internalized values as guides of conscious behavior are displaced by normative *ad hoc* prescriptions, politically dictated, and a set of outward behavior rules. Therefore the Soviet code furnishes a series of normative "moral behavior" propositions which run like this:

(1) Do not steal or destroy socialist property; *but* it is "morally right" to rob a capitalist bank in order to foster the revolution. (Stalin was "right" in robbing a Czarist bank.)

(2) Respect your father and mother; *but* denounce them to the authorities if they engage in counterrevolutionary activity. (Pavlik Morosov was "right" in denouncing his parents, who were *kulaks*.) [12]

(3) Obey and respect your teacher; *but* inform your school principal and the Komsomol organization if the teacher is tolerant toward expressions of religious views. (Teachers have been "rightly" fired for this offense.)

(4) Lend your support to the banning of war, for war is wrong and all weapons of mass destruction should be prohibited; *but* it is right and just for Chinese, Arab, or Cuban nationals to wage wars of liberation against "imperialists," and they should receive your support. "Wars of liberation" are just.

Alongside of these, there are lesser "moral" instructions such as:

(1) Do not spit on the sidewalk, for it endangers the health of the socialist community.

(2) Give your seat on the streetcar to an aged person; he should be honored for his productive contribution to socialism.

(3) Do not bend corners in books, for this destroys socialist property.

(4) Always have with you your school identity card,[13] for children, like adults, should obey the laws of the U.S.S.R.

Although Soviet educators claim that their objective is to develop both the will and conscious moral behavior, it is hard to understand how the uncontrolled relativism in larger issues and minor proscriptions in everyday affairs can

[8] *Pravda*, Apr. 4, 1959. The chairman of this council is Iu. P. Frantsev, Corresponding Member of the Academy of Sciences, with many academician members, including Topchiev, Bardin, Mitin, and Tolstov.

[9] *Uchitel'skaia gazeta*, Dec. 17, 1957 (editorial, "We Must Educate Convinced Atheists").

[10] Lenin, *Sochineniia*, vol. 31, p. 267.

[11] See G. S. Counts and N. Lodge (tr.), "*I Want To Be Like Stalin*," New York: The John Day Co., 1947.

[12] This was a well-publicized case in the early 1930's, the account of which is still found in Soviet textbooks today. The boy, Pavlik Morozov, revealed to the Government a cache of grain hidden by his parents during the fierce collectivization drive and expropriation of the peasants. The boy was killed by his father for betraying the family and became a communist hero, while his *kulak* father was tried and executed.

[13] All Soviet students must carry with them their "school pass," containing elaborate rules of behavior. If these are violated, the student can be reported to the school authorities for disciplinary action.

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possibly result in a fully developed "conscious morality."

The code of "do's and do-not's" and the acceptable rules of behavior constitute the foundation of what one Western observer has called a process of "character formation through social interaction." [14] Soviet educators believe in the environmental foundations of behavior. Through this belief they seek to develop an ideal personality—the "new Soviet man," or, as it is now called in the Soviet press, "new men—builders of the communist society." To what extent they succeed or fail in achieving this goal is largely a matter of guesswork; but some astute Western observers are inclined to think that the very neglect by Soviet educators of the individual child as a human being endowed with a unique personality foredooms this aspect of the communist educational effort to failure.[15] Soviet character training constitutes a conditioning process calculated to produce the right responses.[16] This holds true for the process of subject matter learning no less than it does for child behavior.

The result is not the development of a new and ideal personality, but rather the establishment of control over the individual. In this way discipline and obedience become the cornerstones of Soviet pedagogy, which is based largely on Makarenko's thesis that "in a socialist society free from all other-worldly foundations of morality, discipline becomes not an instrumental but an absolute, compulsory moral category." [17]

Makarenko, the most widely acclaimed spokesman of official Soviet pedagogy, was the bitterest opponent of Western influences in Soviet education. He was also an ardent spokesman in the pedology purge of 1936. For him, the entire experiment of the 1920's in Soviet Russia was a sham and "the work of charlatans." [18] The fundamental principles of his educational philosophy were self-discipline and productive activity. Applied or even abstract learning was equivalent to work; the entire process of education was "work with discipline." Most of the punitive and authoritarian attributes of traditional schooling were put on a pedestal in the Soviet Union, largely as a result of Makarenko's dogmatic assertions.

The educational principle of fostering self-discipline among pupils has been the obsession of Soviet schools for several decades. When in the 1920's progressive tendencies and permissiveness prevailed, anarchy ruled in the Soviet school. By the mid-1930's the pendulum had swung in the opposite direction; the strictest kind of discipline was enforced. The sternest of decrees on strengthening discipline in the school was issued on September 3, 1935, at which time the "code of behavior" or "rules for pupils" (*pravila dlia uchashchikhsia*) were promulgated for the first time.[19] Since then, scores of ordinances and regulations have been issued by the Communist Party, the Soviet Government, and Ministries of Education, with each complaining that discipline had broken down despite the efforts of the schools. In 1943 special identity cards for pupils were introduced, and 20 rules of behavior laid down.[20] In more recent years discipline was still considered weak; repeated strictures placed the blame on the "permissiveness of parents" [21] who were said to spoil their children, and by word and deed to encourage them to violate the "code of behavior" laid down by school authorities. Parents were said to be excessively protective, and by coddling their children caused them to become juvenile delinquents.[22] They defended their children against disciplinary action, and shielded them from exertion and physical chores. Worse yet, some parents even did their children's homework.[23] Confronted with this situation, some Soviet educators demanded that parents

[14] M. A. May, *The Role of Psychology in Soviet Education*, 1959 (mimeo. report). A broader account of the role of psychology in Soviet educational research may be found in H. A. Murray, M. A. May, and H. Cantril, "Some Glimpses of Soviet Psychology," *The American Psychologist*, vol. 14, No. 6 (June 1959), 303–307.

[15] H. Alt and E. Alt, *Russia's Children*, New York: Bookman Associates, 1959, *passim*.

[16] D. W. Miles, *Russian Education*, Sept. 22, 1958 (mimeo. report), especially pp. 7–8.

[17] A. S. Makarenko, *O kommunisticheskom vospitanii: izbrannye pedagogicheskie proizvedeniia* (Writings on Communist Education: Selected Pedagogical Works), Moscow, 1952, p. 48.

[18] *Ibid.*, p. 49.

[19] Deineko, *Spravochnik*, p. 42.

[20] *Ibid.*, p. 222. See the English translation and discussion in Counts, *The Challenge of Soviet Education*, pp. 74–75. Also Bereday, Brickman and Read, *op. cit.*, ch. 18.

[21] N. I. Bokarev, *Vospitanie distsipliny u detei v sem'e* (The Problem of Discipline among Children in the Family), Znanie Series, Moscow, 1955, *passim*.

[22] *Uchitel'skaia gazeta*, Oct. 20, 1956.

[23] These parental "aberrations" were exposed in a scalding attack by A. Demina, "Ne slishkom li ikh opekaiut?" (Aren't They Protected Too Much?), *Izvestia*, Sept. 1, 1957.

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exercise stricter control over their children and "hold them responsible for all [their] acts." [24] Failing this, they contended, the parents themselves should be held responsible for the behavior of their children.[25]

The educational process in the Soviet Union is conceived in terms of the group, the strengthening of whose bonds with the individual has been the subject of considerable discussion.[26] In school the "classroom group" and the "school group" are considered the ideal unit of activity, and the individual's "belonging" is encouraged through extracurricular activities, classroom indoctrination, and by means of the school wall newspapers and frequent meetings.

Discipline and "morally" virtuous behavior are recognized through the application of the reward and punishment principle toward the individual through a "group." Rewards are usually bestowed in the form of public acclaim by the teacher or by the Pioneer or Komsomol organization. "Good" students are cited in the wall newspaper in the classroom or their names are posted on a special red bulletin board in the school. Punishment is inflicted by shaming the pupil before the "group" or by such direct means as suspension or expulsion from school. Physical punishment is entirely taboo in Soviet schools, though common in the home. It is *public* condemnation or acclaim which supposedly is the most effective means of administering punishment or reward.

But apparently none of these corrective measures has been successful. Educators have continued to complain that pupils were growing up to be "totally dishonest," that violations of "elementary honor" and of "common honesty and truthfulness" were widespread.[27] "Lying and cheating, . . . everyday occurrences," persisted despite the efforts of teachers and the Komsomol and Pioneer organizations to discourage it. Strict codes of loyalty were enforced: To tell on another student was an act of treason against the "group." For his "treachery" the traitor was frequently administered a "group beating."

In the classroom and in the preparation of homework, students often copied each other's work. Among some, a system of specialization has been devised. One student, for example, would prepare the mathematics assignment, another literature, and so on, then turn in homework that each had copied from the other. Crib notes were used during examinations. During oral recitations, students read answers from books, or were coached by other students. Indeed, cheating became so frequent and adroit that some teachers simply overlooked it in order to proceed with their instruction.[28]

Still another example of this "vestige of capitalist schooling" [29] was that teachers themselves were occasionally caught in acts of "pedagogical dishonesty" such as coaching, giving answers, or "steering" pupils to the right answers during a final examination.[30]

The transgressions of students—"serious violations of all norms of communist morality"—were catalogued in a Soviet pedagogical journal as follows: "(1) Total disrespect for socialist labor; (2) desire to sponge on everyone, (3) disrespect toward adults; (4) continuous lying; (5) excessive profanity; (6) outright acts of debauchery; (7) petty crimes; and (8) distrust of everyone." [31] The conclusion drawn from this was a remarkably candid one, namely, that in moral instruction the Soviet school deals with matters which are "really in the province of the criminal courts."

Most Western observers agree that Soviet schoolchildren appear to be extremely well behaved and polite.[32] But the hidden facets of character are in the final analysis the determinants of true morality, and it is for this reason

[24] N. I. Boldyrev, *O kommunisticheskom vospitanii detei* (Concerning the Communist Upbringing of Children), Znanie series, Moscow, 1955, p. 15.

[25] V. S. Tadevosian, *Prava i obiazannosti roditelei v sovetskom gosudarstve* (Rights and Obligations of Parents in the Soviet State), Moscow, 1947, p. 17.

[26] A variety of measures to foster "collectivity" are discussed in many books and pamphlets. One very interesting summary is in V. E. Gmurman (ed.), *Iz opyta organizatsii i vospitaniia uchenicheskogo kollektiva: pedagogicheskie chteniia* (An Experiment in Organizing and Educating the School Collective: Pedagogical Readings), Moscow, 1955.

[27] I. S. Kamenogorskii, *Vospitanie chestnosti i pravdivosti u detei* (Teaching of Honesty and Truthfulness among Children), Znánie Series, Moscow, 1955, p. 28.

[28] *Ibid., passim.*

[29] *Idem.*

[30] "Ekzamen s podskazkoi" (An Examination with Coaching), *Uchitel'skaia gazeta*, June 10, 1958. For an extensive account of the various aberrations in Soviet school practice, see F. Vigdorova, *Diary of a Russian Schoolteacher*, New York: Grove Press, 1960. See also the account of numerous deceptions on the part of teachers in *Uchitel'skaia gazeta*, Apr. 6, 1961.

[31] Uchitel' i ucheniki: diskussiia" (Teacher and Pupils: A Discussion), *Uchitel'skaia gazeta*, Dec. 15, 1956.

[32] Alt and Alt, *op. cit., passim.*

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that moral training is the area of Soviet education that is most difficult to appraise. Behavior outside the school is a related but separate study. Much has been written in Western literature about the *stiliagi,* who are variously described as the "beat generation" of Soviet youth, and as juvenile delinquents, petty thieves, and common hooligans.[33] The lack of moral fiber coupled with the desire to escape the harsh and oppressing reality of Soviet daily life are manifested in many ways in the behavior of Soviet individuals. The scant attention paid to these social problems does not mean that they do not exist, but that such matters are deliberately underpublicized.

Communist education is effective enough in its conditioning process so that children and youths seldom misbehave in public. But what is the price of this overdiscipline and overdirection of education?

> The Soviet secondary school does not develop, but stifles all initiative . . . . Learning without direction does not exist . . . . Even such voluntary activities as Komsomol meetings can take place only when a school director or teacher-supervisor is present . . . . The quality of work of the teachers is measured by the percentage of students admitted to higher education . . . . The universities receive totally immature students . . . . Those who are graduated are persons totally incapable of creative ability . . . .[34]

This observation was no malicious Western judgment of Soviet education, but a Soviet statement recognizing that more character training and more moral education were needed. To fortify the "new Soviet man" in his struggle for "the most just society on the face of the earth," he must be taught such virtues as "unselfishness," "endurance," "dedication," "clarity of purpose," "tenacity in working toward goals," "firmness of will" and "love of labor."[35]

Extracurricular Activities and Partisan Youth Organizations in Soviet Schools

It has already been pointed out that education in the Soviet Union is designed to perform certain tasks of political and moral indoctrination, and that this colors the curricular content and subject matter of instruction, more in some areas than in others. But curricular instruction is not the only means of achieving indoctrinational objectives. It is also essential to consider the dual role played by the party youth organizations, both as an instrument of political indoctrination and as a means of furthering the educational process and the development of special abilities.

In the last four decades, there has been a gradual shift of emphasis in the activities of these organizations from exclusive preoccupation with political indoctrination to a broader educational role. This does not mean that their indoctrinational function has diminished; on the contrary, the extension of their sphere of operations to embrace extracurricular educational activities has indirectly strengthened their political effectiveness by helping to attract greater youth participation.

In the 1920's and early 1930's, both the Komsomol (Young Communist League) and the Pioneers interfered considerably in the day-to-day administration and teaching activities of primary and secondary schools. They were elite party groups engaged exclusively in political activity, and they not only interfered freely in school affairs, but often virtually gave orders to the school authorities and teachers. However, as a result of the school reforms of the mid-1930's and measures introduced during the war, these two organizations were deprived of the right to interfere in the conduct of instruction, and instead were transformed into instruments of the school administrations, useful in maintaining discipline, promoting learning, and organizing extracurricular activities. These activities have emphasized sports, physical recreation and creative pursuits rather than direct political indoctrination, but mass indoctrinational activity, more carefully guided and directed by the school authorities, has remained.

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[33] A. Kassof, "Youth Versus the Regime: Conflict in Values," *Problems of Communism,* No. 3, vol. 6 (May-June 1957), 15-23.

[34] N. Dolinina, "Initsiativa i ukazka" (Initiative and Direction), *Oktiabr'* (October), No. 11, November 1956, pp. 99–107, this quote p. 103.

[35] G. E. Filimonov, "Protivopolozhnost' mezhdu kommunisticheskoi i religioznoi moral'iu" (The Opposition of the Communist to Religious Morality), *SSO,* No. 12, December 1959, 31–36, this quote p. 32.

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1. *The Pioneer Organization and its Extracurricular Activities*

The Pioneer organization emerged as an adjunct of the Komsomol in 1922 and was officially recognized and chartered by the Communist Party in May 1924. The present official title is All-Union Pioneer Organization of V. I. Lenin (*Vsesoiuznaia Pionerskaia Organizatsiia imeni V. I. Lenina*). Its membership was about 200,000 in 1924 and in 1954 numbered about 20 million.[86] Membership probably declined in the late 1950's because of the drop in school-age population. Official figures have not been published, but it may be estimated, on the basis of enrollment figures,[87] that membership dropped to about 12 million.

Until 1957 membership in the Pioneers was open to youngsters aged 9 to 14; currently it enrolls youths of either sex between 10 and 15.[88] An overwhelming majority of students in the intermediate grades belong to the Pioneers. In the late 1920's and the 1930's there was a separate division for children aged 7 and 8, called Octobrists (*Oktiabriata*). This apparently was discontinued during the 1940's and early 1950's, but in the late 1950's Octobrist units were revived, with membership open to children aged 7 to 9.

Pioneer and Octobrist activities are conducted under Komsomol leadership, but are supervised by school authorities. The Pioneers and Octobrists are organized into "links" and "squads" formed within each class group of a given school grade. One class forms a squad, which consists of 2 to 4 links, depending on the number of pupils; and each school unit of the Pioneer organization has as many squads as there are classes in the respective grades. All the squads of one school form a troop.[89] Squad leaders are elected (actually coopted), and the troop has an elected "council." Each Pioneer becomes a member of the organization upon taking an oath to obey the rules of the organization and pledging allegiance to the Communist Party, to defend the fatherland, and to do his "duty as a student."

The school unit as a whole or individual squads of the Pioneer organization meet variously to hear indoctrination lectures, to watch movies, and to view amateur performances of plays, choral and musical shows. On other occasions or on the same program with these affairs, meetings are held to discuss such school matters as discipline, attendance, and study performance, and on these occasions exemplary pupils are publicly praised and poor performers chastised. In addition, praise or castigation is indicated on the school's bulletin-board "newspaper," which is commonly prepared once a month and posted in a corridor or entry way of the school. "Transfer banners" are given to squads for maintaining the best discipline or grade record during a month; and, when appropriate, names of students are posted on red (honor) or black (shame) boards to accord praise or censure. School authorities generally assign a special room for use as Pioneer headquarters. All of these Pioneer activities are controlled and directed by the school administration.

Pioneer units—link, squad, and troop—elect their leaders and "secretaries," which compose the active Pioneer leadership. In addition, the Komsomol appoints full- or part-time Pioneer leaders to supervise and organize activity. Very large schools often have a full-time Pioneer leader, who is a paid functionary of the Komsomol, attached to a given school. From time to time, usually on a local or regional level and less frequently on a national level, the Pioneer organization stages official assemblies, which are 1- or 2-day gala affairs with political speeches and generous entertainment. The Pioneer organization also participates in a variety of other activities, such as regional sports meets and national literary and scientific competitions. The central organs of the Komsomol also publish, on behalf of the Pioneer organization, a national newspaper, *Pionerskaia pravda* (Pioneer Truth).

In addition to organized group activities, there are three "achievement stages" for in-

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[86] *Medynskii—1955*, p. 94.
[87] Appendix table II–A–3.
[88] The most complete survey of Pioneer activity may be found in: Akademiia Pedagogicheskikh Nauk RSFSR, Institut Teorii i Istorii Pedagogiki, *Razvitie samodeiatel'nosti uchashchikhsia v pionerskoi organizatsii* (Developing Independent Activity in Students of the Pioneer Organization), Moscow, 1958 *passim;* see also *APS–NarObr—1957*, pp. 236–250.
[89] Deineko, *Spravochnik*, pp. 336–338.

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dividual Pioneers: [40] the first for Pioneers in grades 3–4, the second for those in grades 5–6, and the third for those in grades 7–8. Each "achievement stage" has its requirements, which include knowledge of prescribed songs and dances, recognition of flowers, use of the compass, sports achievements in swimming and track, mapreading, Morse code, rifle shooting, tractor driving, and repairing electrical appliances. In order to develop a variety of aptitudes, the Pioneer organization runs two types of programs, one attached to the schools in the form of study circles and clubs, and the other attached to its network of Pioneer "palaces and homes," which are operated independently of the schools. These "palaces" may be sumptuous buildings, such as the one in Moscow, or they may be dingy neighborhood "homes," such as the Kirov regional Pioneer home in Leningrad "located in the quarters of a former barbershop." [41] The Pioneer study circles and clubs engage in a variety of educational and cultural activities ranging from scientific experiments to piano and ballet lessons.[42]

These activities, whether conducted under school auspices or in the facilities of the Pioneer organization, have one peculiar attribute. Soviet sources are explicit in emphasizing that such activities are not to be regarded in any way as entertainment, amusement or "good-time get-togethers," [43] but primarily as a supplement to education. In the classroom each student must perform all work required by the school program. Extracurricular circles and clubs provide additional training in a specific area of the pupil's interest, be it sports, piano playing or physics. In the classroom the teacher's concern is with the education of the group; in extracurricular activities the same teacher (under the sponsorship of the Pioneer organization) is supposed to concentrate more on stimulating the particular abilities and interests of the individual.

Soviet educators recognize the following extracurricular activities: [44]

(1) "Subject-matter" clubs (*predmetnye kruzhki*), which supplement regular school courses in such subjects as mathematics, physics, chemistry, and astronomy. The clubs explore the subject more deeply than prescribed by the school syllabus and provide an opportunity to stage experiments in the school laboratory.

(2) Technical clubs (*tekhnicheskie kruzhki*), which offer a wide range of hobby-type activities, such as airplane modeling, photography, and "ham" radio operation.

(3) Art clubs (*kruzhki khudozhestvennoi samodeiatel'nosti*), which provide training for those with particular abilities in singing, dancing, and painting, and which integrate pupils *en masse* in such activities as drama circles for staging school plays.

(4) "Social-political" clubs (*sotsial'no-politicheskie kruzhki*) or debating clubs (almost exclusively in the upper grades), which engage in discussion of current political topics, history, and party pronouncements.

(5) Sports clubs (*sportivnye kruzhki*), oriented primarily toward "team" activities such as soccer, volleyball, or basketball, or paramilitary activity such as long-distance skiing, rifle marksmanship, and boating.

(6) Natural science clubs (*estestvoispytatel'skie kruzhki*), engaging primarily in such activities as observing, collecting, or raising plants or breeding animals. These clubs observe natural phenomena, conduct trips, and carry out experiments outside the confines of the school building or grounds. Geology and topography clubs are included in this category.

(7) Home economics clubs (*domovodcheskie kruzhki*), set up to teach sewing, cooking, and other domestic arts almost exclusively to girls.

Clubs of a paramilitary nature are also known to exist, which engage in developing civil defense skills. The Soviet paramilitary and civil defense organization, the DOSAAF, guides the activities in these clubs and also directs some of the activities in technical and sports clubs (i.e., amateur radio, marksmanship).

In addition to the activities carried on in the circles and clubs during the school year, the Pioneer organization also conducts summertime activities. In 1958 there were 7,540 Pioneer summer camps accommodating a total of 3,018,800 Pioneers,[45] or about one-fourth of the total child population in the age bracket of the

[40] The requirements for each stage were clarified by a recent decree of the Central Committee of the Komsomol (*Komsomol'skaia pravda*, July 31, 1958).

[41] *Komsomol'skaia pravda*, Aug. 2, 1958.

[42] For a discussion of science club activities, see E. S. Lowman, "Measures Utilized in the U.S.S.R. to Motivate Youth into Science-Technology Fields," *The Bulletin of the National Association of Secondary School Principles*, vol. 41, No. 230 (September 1957), 17–21.

[43] N. I. Alpatov, *Vneklasnaia vospitatel'naia rabota v gorodskoi srednei shkole: Posobie dlia uchitelei* (Extracurricular Educational Activities in the Urban Secondary School: Teacher's Aid), Moscow, 1949, p. 60.

[44] *Ibid.*, p. 74.

[45] *NarKhoz–1959*, pp. 826–827.

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Pioneer organization. The average period of stay at these camps has not been reported, but from accounts of Soviet expatriates and recent American visitors to the U.S.S.R., it appears to be from 2 to 10 weeks, with the usual period about 1 month. The duration depends partly on the wishes of the parents, but mainly on the type of camp, i.e., its particular sponsorship and purpose. The quality of accommodations ranges from "model camps" in the high Alpine regions to impoverished shacks on the river banks just outside city limits. Pioneer camps are frequently "sponsored" by the trade union organizations of individual economic enterprises, which partially finance the camp activities. Except for a setback during World War II, the number of children attending Pioneer summer camps has been increasing gradually ever since the camps were first established in 1925.

A handbook regarding Pioneer camps indicates that their activities are in many respects quite similar to those of the Boy and Girl Scouts in the United States.[46] Outdoor activities such as camping and hiking, sports, games, hobbies, and nature study are all included in the programs of the Pioneer camps. There are significant differences, however. Unlike the Boy Scouts, the Pioneer organization is characterized by strict regimentation and discipline; social activity is given political coloration; songs and even games are intense and rigorous.

Another extracurricular outlet for Soviet youngsters, principally under 12 years of age, is the supervised summer playground, which was instituted in the mid-1930's. In 1958 there were 33,574 summer playgrounds used by an average of 1,335,900 children daily.[47] The volume of use has generally fluctuated with the size of the school-age population. In the early 1950's, for instance, there was a 20 percent decline in the number of children using the summer playgrounds, paralleling a similar drop in elementary grade enrollment (see below).

The extracurricular activities of the Pioneer groups are regarded in the Soviet Union as a "preventive measure" against "the emergence of children's nervous disturbances," [48] misbehavior, and delinquency. Soviet authorities claim that because of the "favorable socioenvironmental factors prevailing in the U.S.S.R., the conditions for nervous disturbances among children are absent." [49] When these conditions do appear, however, they are best counteracted by drawing the child either into productive labor or into intensive extracurricular Pioneer activity. The same is true with respect to delinquency. The Pioneer organization plays an important part in guarding against delinquency by keeping children busy and off the streets.

The primary objective of the activities of Pioneer clubs is the development of special aptitudes and skills. Soviet educators call this "development of self-activity" (*razvitie samodeiatel'nosti*), and many of the projects are based on the major postulate of the progressive educational theory, learning through doing. Peculiarly enough, Soviet educators have made this a supplemental task of the school in addition to regular classroom instruction. In this sense Pioneer activity should be viewed as an effective aid to the school program. In addition, ideological upbringing is not overlooked.

Whatever the Pioneers do, they are continually reminded to develop "Pioneer romanticism, which is first and foremost the romanticism of creative labor . . . of the individual, of the collective engaged in the building of communism." [50] This kind of "romanticism" is simply a pseudonym for indoctrination. However, Soviet refugee accounts indicate almost without exception that the Pioneers owe their popularity among Soviet youth not to their indoctrinational activities, but to the tangible benefits derived through membership. By their own observation or through their parents' advice, children begin to realize at an early age that membership is advantageous for their future careers besides providing immediate rewards as well. After all, few pupils can resist the temptation of wearing the red scarf of a Pioneer, especially when it means several weeks of free summer camp, admission to hobby clubs, and

[46] V. Strunin (comp.), *Pionerskii lager'* (Pioneer Camp), Moscow, 1947.

[47] *NarKhoz–1959*, pp. 824–825.

[48] T. P. Simson, *Detskaia nervnost', ee preduprezhdenie i lechenie* (Child Neurosis, Its Prevention and Cure) (VOPR-PINZ Lecture Series), Moscow, 1949, p. 37.

[49] *Idem.*

[50] V. Strunin, "O romantike v pionerskoi rabote" (Concerning the Romanticism in Pioneer Work), *Narodnoe obrazovanie*, No. 12, December 1956, p. 67.

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admission to puppet shows and movies at reduced prices. These tangible benefits are probably more effective persuaders than direct indoctrination and political action.

2. *The Komsomol Organization*

The Young Communist League, known in the Soviet Union by the official abbreviation *VLKSM* (*Vsesoiuznyi Leninskii Kommunisticheskii Soiuz Molodezhi*—All-Union Lenin Communist Union of Youth), or more commonly the *Komsomol,* is an organization for youths aged 15 through 27.[51] There is no upper age limit for Komsomol officers, who are usually Communist Party officials as well. The Komsomol is an arm of the Communist Party. It is organized in the image of the party, with a parallel hierarchy of organs from the local level all the way up to the Central Committee of the *VLKSM*.[52] But unlike the Communist Party, the Komsomol has no real political power, and all its activities are directed by the Communist Party's division on Komsomol affairs.

Membership in the Komsomol organization has grown as follows: [53]

1918 (Oct.)	20,000
1931 (year end)	3,000,000
1936 (year end)	4,000,000
1949 (year end)	9,300,000
1953 (Nov.)	18,000,000
1954 (Mar.)	18,825,327
1957 (Jan.)	18,000,000
1959 (Jan.)	18,000,000

These figures show that the Komsomol, prior to World War II, was an elite organization,[54] to which only 10 to 12 percent of eligible youths belonged.

Although reliable population figures are lacking for the immediate postwar period, probably as many as 25–35 percent of youths in the 14–26 age group were Komsomol members at that time. But the real transformation of the Komsomol into a mass organization took place between 1949 and 1953, during which time the membership doubled, from 9 million to 18 million. Since 1953, membership figures have changed very little, remaining at the level of 18 million. This figure represented 44 percent of the 15–26 age group in January 1959.[55] The standstill in membership during these 6 years is largely a reflection of selective recruitment policy, but also, to some extent, of the demographic factor.

Membership turnover in the Komsomol seems to be high. During the four years between the two recent Komsomol congresses (the 12th Congress in March 1954 and the 13th Congress in April 1958) 10 million youths joined the ranks of the organization, or about 2.5 million per annum.[56] Since the total membership did not change significantly (if anything, membership declined slightly), it is evident that an equal number left the ranks of the organization during the same period. This accounts for a total turnover (those newly admitted plus those who leave) of about 5 million persons a year, or a 28-percent membership turnover per annum.

Obviously not all members of this communist mass youth organization are pupils in the regular schools. In 1948 there were about 1 million Komsomol members in all Soviet secondary schools (chiefly in grades 8–10).[57] Since enrollment in these grades in 1948 was also about 1 million,[58] virtually all upper-grade students were Komsomol members. As upper-grade enrollment expanded in the early 1950's, the proportion of Komsomol members among upper-grade students declined; and in 1955 only one-half of all upper-grade students were members (i.e., about 2,500,000).[59]

The Komsomol organizations in secondary schools are the same as in economic enterprises. In each school there is a single Komsomol unit which holds regular monthly meetings and has an elected secretary and governing board (*biuro*), who are in continuous touch with the regional or city office of the Komsomol, usually

[51] Until 1957 Pioneers aged 14 were eligible to join the Komsomol, and the age ceiling was 26. *Komsomol'skaia pravda,* Nov. 12, 1957.

[52] The most up-to-date survey of the institutional history of the Komsomol and its policies, as reflected in the proceedings of Komsomol congresses, may be found in R. T. Fisher, *Pattern for Soviet Youth,* New York: Columbia University Press, 1959.

[53] *Spravochnik Komsomol'skogo propagandista i agitatora* (Handbook of the Komsomol Propagandist and Agitator), 2d ed., Moscow, 1957, p. 85; Fisher, *op. cit.,* p. 409; *BSE–YB–1958,* p. 10; *Komsomol'skaia pravda,* June 30, 1959.

[54] Pre-1948 data are conveniently summarized in the official digest: G. Eligulashvilli (comp.), *VLKSM v tsifrakh i faktakh* (The Komsomol in Figures and Facts), Moscow, 1949.

[55] Appendix table II–A–5.

[56] *Pravda,* Apr. 15, 1958.

[57] *Komsomol'skaia pravda,* Oct. 29, 1948 (speech by Mikhailov, Secretary General of the Komsomol).

[58] Appendix table II–A–3.

[59] Pichugina, *op. cit.,* p. 37.

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located in the same building as the Communist Party regional or city office. Komsomol meetings are sometimes open to all students, sometimes "closed," in which case only card-carrying Komsomol members are admitted. Various school affairs are discussed at the meetings.

The Komsomol unit is supposed to aid the school authorities by measures to ensure diligent study and enforce discipline. The Komsomol also supervises the school's Pioneer activities. In large schools it maintains full-time Pioneer leaders,[60] and its members, as part of their "voluntary assignment," act as Pioneer leaders for squads and troops in the same school. The Komsomol organization of the school also stages various campaigns and drives decreed by the Communist Party. It prepares a bulletin-board "newspaper" similar to those of the Pioneers, which publicizes both the meritorious achievements and transgressions by students. The Komsomol selects students for social work, which may range from scrap collection to cleaning classrooms or assisting in census taking. Overloading Komsomol members with "social work" to the detriment of their studies has been a perennial issue, despite a number of stern governmental and party decrees against it.[61]

Political indoctrination in the Komsomol is taken much more seriously than in the Pioneers. The Komsomol is supposed to aid the educational authorities in all aspects of the moral education of students, but literally hundreds of reports in the Soviet press [62] attest that the end result is far from satisfactory. Indeed, Komsomol members are said to display a "*Ni bo, ni cho*" or "couldn't-care-less" attitude. But indifference is only the mildest transgression. The official Komsomol newspaper has often complained of "flagrant abuses" of the Komsomol code of ethics, such as drunkenness, debauchery, dishonesty, and theft.[63] Periodically, the Komsomol is ordered to clean house, to get rid of "opportunist members," and to rededicate itself to the "ideals and romanticism of its revolutionary heritage."

A question frequently raised in the West is whether or not Soviet youth support the regime and are genuinely dedicated to the cause of communism. Some Western observers return from brief trips to the Soviet Union thoroughly convinced that the regime enjoys the enthusiastic approval of the populace, and of youth in particular. Aside from the fact that Western visitors are shown only what the Soviet authorities want them to see, something more fundamental must be borne in mind in judging the attitude of youth.

Youth in the Soviet Union, as everywhere else, is anxious to get ahead, and at the present time the Soviet people as a whole have no alternative but to accept the existing communist regime as the only vehicle for this betterment. The ferment among Soviet youth is caused by the fact that the desired improvement does not come soon enough. But determination to succeed is hardly synonymous with love of, and unconditional dedication to, the communist faith. The Soviet youth's conscience apparently is not disturbed by applauding the customary oratory at monthly Komsomol meetings. By attending, he establishes a "good record" which may eventually improve his chances of admission to a higher educational institution or of getting a job slightly better than he might otherwise obtain. Under such conditions, it is obviously difficult to judge to what extent the participation of youth in Komsomol activities is purely opportunistic, and to what extent it reflects genuine conviction. While there are undoubtedly some idealists who believe in the tenets of communist ideology, there are likewise many others who are merely outward conformists.

Quantitative Trends in Soviet Primary and Secondary Schools

School enrollment is one of the chief quantitative indices for measuring educational opportunity in any society. Without knowledge and appreciation of the "quantity of education" as expressed in enrollment, first-year acceptances,

[60] They are usually trained in normal schools and receive secondary semiprofessional education. Full-time Pioneer leaders work only in large schools, Pioneer palaces and homes, and Pioneer camps. In all small schools an upper-grade Komsomol member acts as the Pioneer leader.

[61] Deineko, *Spravochnik*, p. 58.

[62] For a comprehensive discussion of the problem, see A. Kassof, "Afflictions of the Youth League," *Problems of Communism*, vol. 7, No. 5 (September-October 1958), 17–23.

[63] *Komsomol'skaia pravda*, Mar. 19, 1957.

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graduations, success rates and dropouts, appraisals of the "quality of education" are largely devoid of meaning. These are two sides of the same coin; if one wishes to know the status of education in any country, he must look at both sides.

1. *Aggregate Enrollment on the Primary and Secondary Level of Education and its Relationship to Soviet Population*

The Soviet Union professes to have a mass educational system, with one-quarter of the population currently receiving "education" of one type or another.[64] This involves all forms of education—full-time, part-time, general, specialized, primary, secondary, higher, vocational, on-the-job training, military, party, etc. When the *known* enrollments in all these diverse types of educational undertakings are added together, however, they never seem to total up to the figure which Soviet officials have been claiming for over 10 years.[64a] Not all the components of this total have been clarified, leaving Western observers at a loss to judge the significance and validity of the Soviet claim.

Included in this total are the enrollment figures for primary and secondary schools offering full- or part-time general education, as well as enrollments in vocational and semiprofessional schools. Total enrollments in all types of Soviet education on the primary and secondary level for selected years are shown in chart IV; statistics for other years are presented in appendix table II–A–1.

It is evident from the data in chart IV that regular schooling has consistently been the dominant form of primary and secondary education. As for the general enrollment trend in all types of primary and secondary education, there were in 1914 slightly less than 10 million students, and this number, by 1927, had increased only marginally, to 12 million. The figure then shot up rapidly during the prewar phases of industrialization, tripling to 37 million by 1940. It declined during World War II and did not regain the 1940 level of 37 million until 1950. In the mid-1950's it declined to about 33 million or 34 million because of demographic factors. Table II–15 shows enrollments in relation to total Soviet population.

TABLE II–15.—*Soviet primary and secondary school enrollments in relation to total population, 1914–59*

[In millions]

Year	Population	Enrollment, total	Percent of population
1914.....	159.2	9.9	6.0
1927.....	147.0	12.0	12.3
1939.....	190.7	37.2	19.5
1950.....	(est.) 180.0	37.3	(est.) 20.6
1958.....	208.8	34.3	16.4
1959.....	212.0	36.3	17.1

Sources: Appendix tables II–A–1 (col. J) and II–A–5; *NarKhoz–1960*, p. 9.

As shown in table II–15, Soviet primary and secondary school enrollment, as a percentage of the total population, reached its highest levels in 1939 and 1950 (the latter based on estimated population), when it was more than three times the 1914 level. The ratio subsequently declined to about 16 percent in 1958 and rose slightly in 1959 to 17 percent. On the basis of an anticipated 1965 enrollment of 45.5 million in all types of primary and secondary education and an estimated population total of 231 million (assuming continuation of the present 3 million annual increase), the ratio will by then reach about 20 percent, or approximately the level of 1939 and 1950.

The data given in chart IV reveal that enrollment in part-time primary and secondary education for adults grew 19-fold between 1927 (0.1 million) to 1958 (1.9 milion), but accounted in 1958 for only about 6 percent of total primary and secondary school enrollment. Similarly, although vocational-technical and secondary semiprofessional enrollments increased 9-fold and 19-fold, respectively, from 1914 to 1958, together they still accounted for only about 8 percent of total primary and

[64] As of January 1961, there were more than 52 million persons enrolled in education of all types, or about 24 percent of the total population of 216 million. *Pravda*, Jan. 26, 1961 (Itogi 1960).

[64a] The 1960 enrollments were as follows: In regular primary and secondary schools—33,370,000; in schools for working and rural youth—2,800,000; in all types of vocational-technical schools—1,050,000; in semiprofessional schools—2,059,000; in higher education—2,396,000, for a total of 41,675,000 in formal types of education. In addition, there were 9.3 million enrolled in on-the-job training programs. (*SSSR-Tsif—1960*, p. 301, 305.)

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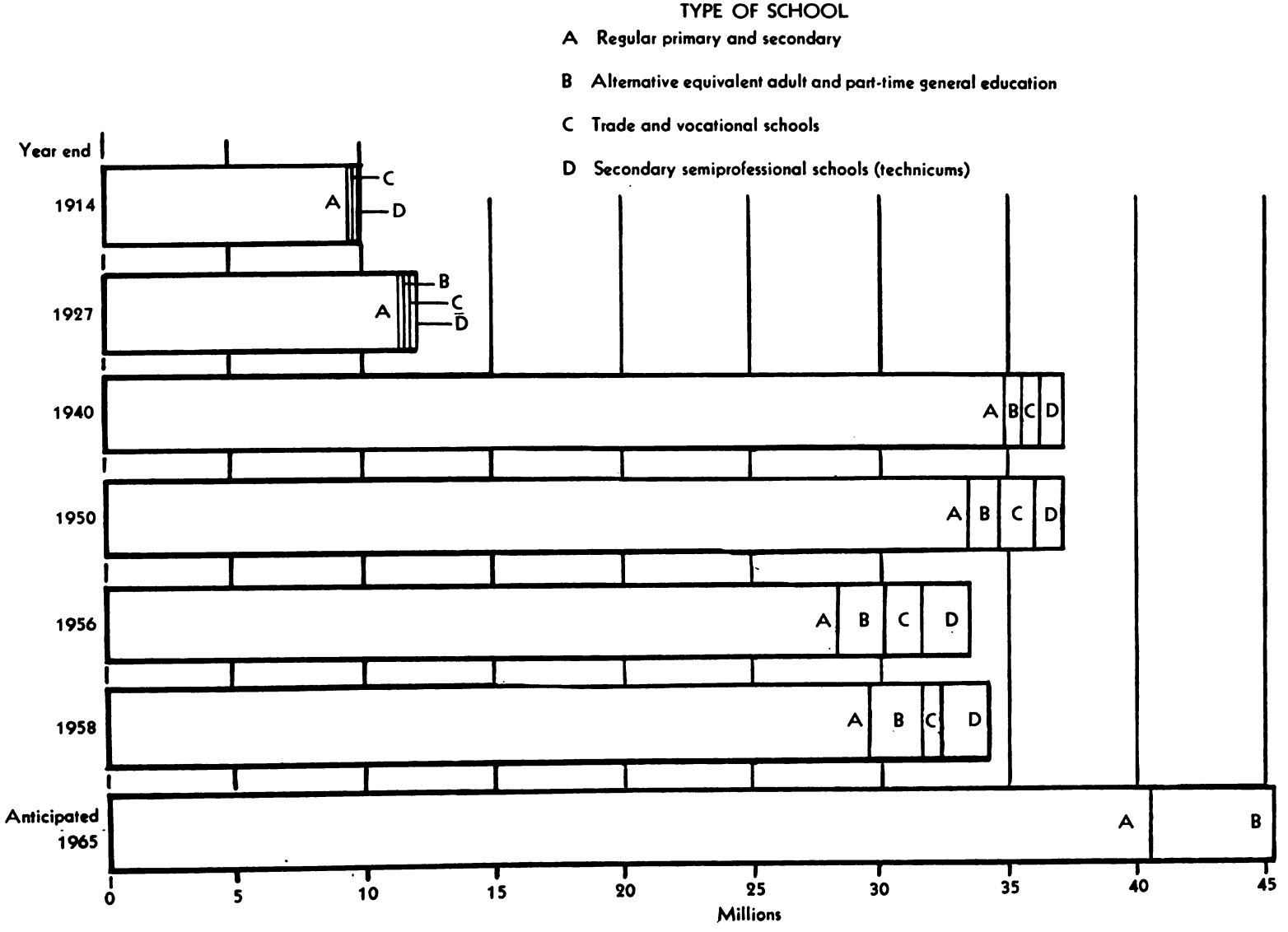
CHART IV.—ENROLLMENT IN THE SYSTEM OF SOVIET PRIMARY AND SECONDARY EDUCATION OF ALL TYPES, 1927–58 AND 1965 PROJECTION



Source: Appendix table II–A–1. See this table for enrollment data in other years (1914–58) and for other breakdowns.

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secondary school enrollment in 1958. Thus, despite the spectacular numerical gains of alternative-equivalent, vocational-technical, and secondary semiprofessional education, they actually accounted for less than 15 percent of total primary and secondary enrollment in 1958, with more than 85 percent of all students still concentrated in regular general education schools. Although part-time enrollment in schools for working and rural youth rose sharply between 1958 and 1960 (from 1,916,000 to 2,800,000) and there was also some increase in vocational-technical and semiprofessional school enrollment, their combined total of 5,909,000 in the fall of 1960 was still only 15 percent of total enrollment in all forms of primary and secondary education (39,279,000).

2. *Enrollment in Regular Primary and Secondary Schools*

Chart V presents enrollment data by grade level.[65] Two noteworthy features brought out are the fluctuations in enrollments at different levels and in total enrollment, and the shifting composition of overall enrollment by grade level. The fluctuations occurred largely because of factors unconnected with the policy of educational expansion followed during the last four decades. The enrollment trends shown in the chart also provide an indication of the degree of selectivity which existed in the Soviet 10-year schools. Despite increasing enrollments on all levels of primary and secondary schooling (grades 1–10), upper-grade enrollment (grades 8–10) until quite recently remained relatively small in relation to the total enrollment.

Total enrollment (grades 1–10).—In Czarist Russia, on the eve of World War I, primary and secondary schools had an enrollment of 7.9 million pupils. During the Revolution and the civil war which followed, most schooling was interrupted, but in 1920 total enrollment in Soviet primary and secondary schools reached almost 10 million. After a decline in the period 1921–24, there was a steady increase to 34.6 million at the beginning of World War II, again followed by a sharp drop during the war. In 1942 there were only 16 million children in Soviet primary and secondary schools, less than half the enrollment 2 years earlier, but by 1945 total enrollment had recovered to about 26 million, or approximately the level of 1935. There was further rapid recovery after the war, and by 1950 enrollment almost regained the prewar level. In that year, 33.2 million students were enrolled in Soviet primary and secondary schools, only about 1.4 million short of the prewar high reached in 1940.

The year 1950 marked a turning point in Soviet school enrollment. Although the author's earlier study published in 1955 presented estimates indicating a drastic decline in enrollment in the early 1950's,[66] official Soviet statistics confirming the drop and showing its extent were not made public until 1957. These statistics revealed that elementary grade enrollment was cut almost in half, dropping from 23.7 million in 1948 to 12.1 million in 1953. This decline resulted from the sharply reduced birth rate during World War II. It was believed prior to publication of the 1959 Soviet census that the birth deficit for the 5 war years was probably about 8 million.[67] It now appears, however, that the actual deficit was close to 12 million for the war years alone, while low birth rates continued into the late 1940's.[68] It is reasonable to suppose that the birth deficit became progressively more severe after 1942,[69] so that its impact did not begin to be felt in the elementary grades of Soviet schools until the early 1950's.

The demographic factor had a major effect upon total enrollment in the 1950's. The lowest level was reached in 1956, with 28 million students enrolled, almost 7 million less than the prewar high of over 34 million in 1940 and 5 million less than the postwar high of 33 million in 1950. Total enrollment increased gradually in the late 1950's, reaching 31 million in 1959 and over 33 million in 1960,[70] about the same

[65] The chart and the discussion below use round figures. For more precise figures, see appendix table II–A–3.

[66] *SPM*, pp. 61, 259, 273.

[67] W. W. Eason, "Population and Labor Force," in A. Bergson (ed.), *Soviet Economic Growth*, Evanston, Ill.: Row Peterson, 1953, p. 103; W. W. Eason, *Population and Labor Force*, appendix, copyrighted manuscript for private circulation. For the most up-to-date discussion, see the same author's article, "The Soviet Population Today," *Foreign Affairs*, vol. XXXVII (July 1959), 598–606.

[68] Appendix table II–A–1; see also discussion in the text below.

[69] In this connection, see also N. Timasheff, "The Postwar Population of the Soviet Union," *American Journal of Sociology*, vol. LIV, No. 2 (Sept. 1948), 152–155.

[70] *Pravda*, Jan. 26, 1961; *SSSR–Tsif–1960*, p. 305.

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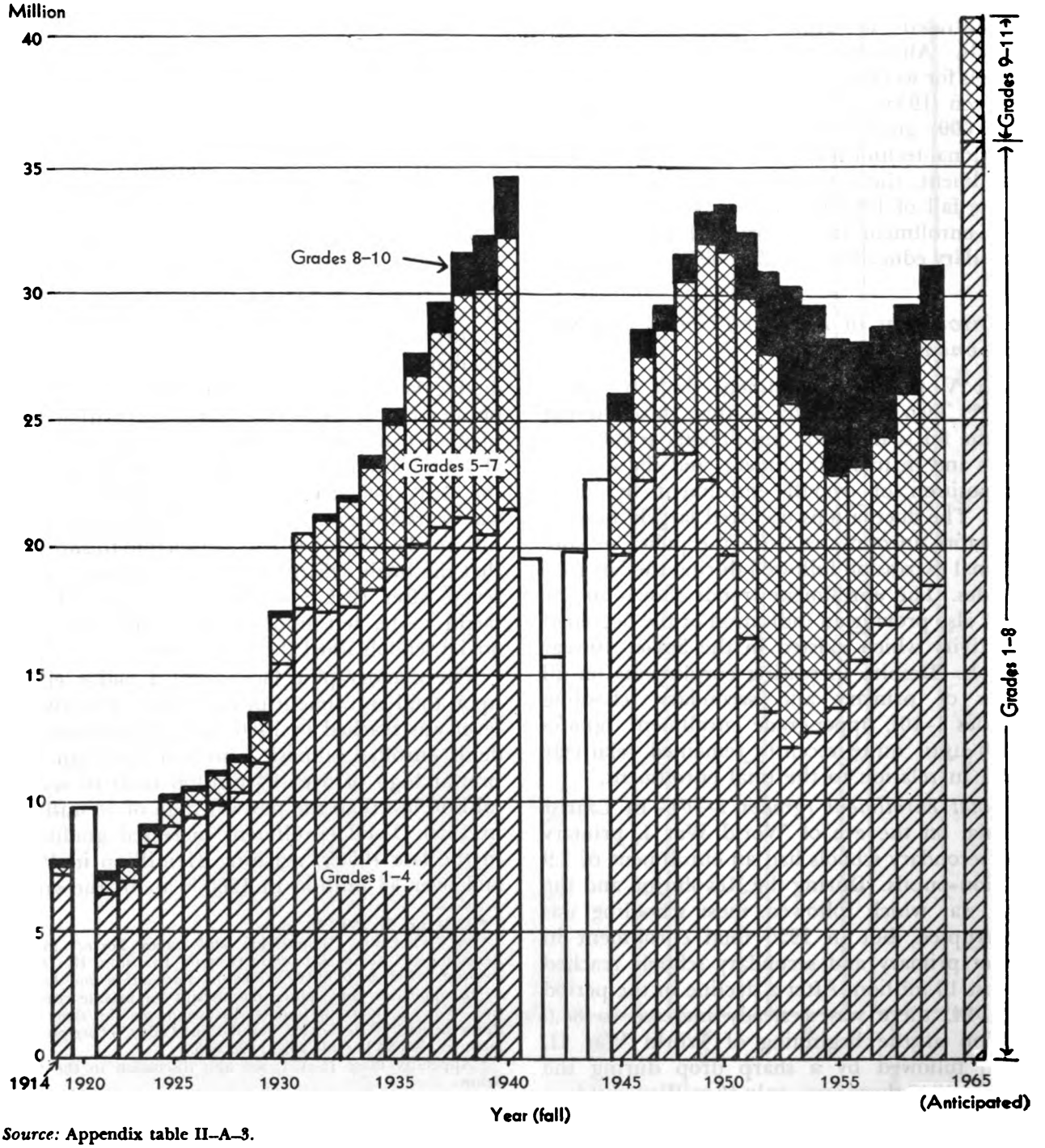
CHART V.—ENROLLMENT IN SOVIET PRIMARY AND SECONDARY SCHOOLS BY LEVEL OF GRADES, 1914, 1920–59 AND 1965 PROJECTION



Source: Appendix table II–A–3.

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as in 1950. In the next 2 years annual increases of about 2 million are anticipated.

Elementary school enrollment (grades 1–4).—The introduction of compulsory 4-year elementary education in the fall of 1930 resulted in a spectacular increase of 7 million pupils in the elementary grades between 1929 and 1931. Thereafter, elementary school enrollment increased slowly until it reached a prewar peak of over 21 million in 1938. (Enrollment figures for 1940 show an increase over 1939, but this was due mainly to the annexation of the Baltic countries and part of Poland. In pre-1939 U.S.S.R. territory, elementary grade enrollment declined both immediately before and during the war as a result of the low birth rate of 1931–32.) It is reasonable to conjecture that elementary school enrollment subsequently dropped below the 10 million mark for the additional reason that the war and German occupation retarded education in general.

The end of hostilities was followed by a period of rapid recovery to a new all-time high of 23.7 million in 1948. In 1949, however, enrollment began to drop suddenly, reflecting the abnormally low wartime births. Indeed, the enrollment of 12 million in 1953 was not much higher than the 1929 figure prior to the introduction of compulsory elementary school education. By the fall of 1958, normalcy was partly restored when enrollment reached a level of 17.7 million. It continued to increase, to 18.4 million in 1959, and was probably around 20 million in 1960.

Junior secondary enrollment (grades 5–7).—Except for the World War II period, enrollment in grades 5–7 increased gradually and without interruption. Under the decree introducing compulsory elementary education, education for children of ages 8–11 was to become universal and compulsory starting in the fall of 1931. Already by 1932 67.3 percent of all children in the pertinent age group (8–14) were enrolled in Soviet primary and junior secondary schools.

It was stipulated in 1931 that, starting in the fall of 1932, a transition to universal and compulsory polytechnical education for all youths up to age 17 would begin "in accordance with longstanding party directives."[71] This was actually only a reiteration of an earlier decree of 1921, but even today this goal still remains unattained. Postwar data indicate that the introduction of compulsory 7-year education in major urban and industrial centers, decreed in 1943,[72] was responsible for a considerable increase in enrollment. By 1950, enrollment in grades 5–7 was 12 million, rising to 14 million in 1952. The introduction of universally *available* 7-year education in 1949 led to a postwar growth in intermediate grade enrollment. In this connection, the Soviet claim that 7-year education is compulsory is contradicted by the certainty that no such goal has been attained in rural areas. In fact, Khrushchev himself disclosed that only 80 percent of those originally enrolled in the 1st grade actually continued through grade 7.[73] Despite efforts to expand 7-year schooling, enrollment in grades 5–7 fell off from 14.1 million in 1952 to 7.2 million in 1957 as the generation born during the war moved up from elementary schools. The enrollment increased slowly after 1957 and by 1959 reached 9.7 million.[74]

Senior secondary school enrollment (grades 8–10).—Enrollment figures for the upper grades of Soviet secondary schools reveal some noteworthy trends. Until the 1934 decree establishing 10-year schooling, there was no consistent policy aimed at expanding upper-grade enrollment. The transfer of upper-grade students into technicums—most conspicuously in 1931—and school reorganizations were common phenomena. In effect, for 3 years (1931–33) there were practically no upper-grade students in Soviet secondary schools, though growth thereafter was steady. By 1951 the 1940 level of 2.4 million was again reached. Spurred by a 1952 policy to increase enrollment in upper grades, a spectacular and rapid increase led in 1955 to an all-time high of 5.3 million students in grades 8–10. This occurred even though 10-year schooling was not compulsory. Undoubtedly much of this expansion was possible because elementary school facilities—unused because of the drastic drop in enrollment—were available to accommodate upper- and intermediate-grade students. In 1956 the lower enrollment classes of the junior secondary schools began to ad-

[71] *Itogi pervogo FYP*, p. 222.

[72] MP RSFSR, Danev, *op. cit.*, p. 36. Most references to official decrees prior to 1947 were verified by using this source.

[73] *Pravda*, Sept. 21, 1958.

[74] *NarKhoz–1960*, p. 730.

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vance into the upper grades. By the fall of 1958 only 3.4 million were enrolled in grades 8–10, and by 1959 this figure had dropped to 2.8 million. Expectations are that this trend will not be reversed in 1961 or 1962, at which time a new low of less than 2 million appears probable.

3. *Primary and Secondary School Enrollment by Level of Grades in Relationship to School Age Population*

In the year following the 1959 census the Soviet authorities released preliminary U.S.S.R. population figures tabulated according to age group.[75] These figures are the basis for the following table II–16.

TABLE II–16.—*Comparison of Soviet school-age populations in 1939 and 1959*

Grade level and age group	January 1939 estimates in postwar boundaries	Census of January 1959	Relation of 1959 to 1939 figures (approximate)
	Thousands	Thousands	Percent
Preschool, ages 0 to 7...	34,784	38,088	+10
Elementary, ages 8 to 11.....	20,042	14,984	—25
Junior secondary, ages 12 to 14.....	17,019	8,565	—50
Senior secondary, ages 15 to 17.....	11,241	10,193	— 9
All levels, ages 8 to 17..	48,302	33,742	—30

Source: *Pravda*, Feb. 4, 1960. See summary in appendix table II–A–5.

From this table, it is obvious that the decline in school-age population in 1959, as compared with 1939, was serious indeed, particularly in the 12–14 age group. On the basis of these statistics, it can be estimated that the 15–17 age group in 1962 will number only 8 million. Almost two-thirds of the upper-grade age group was enrolled in 1955. If in 1962–63 this proportion were maintained, or if universal 10- or 11-year education were allowed to be put into effect, enrollment in technicums and vocational-technical schools, as well as additions to the labor force, would suffer. Consequently, Khrushchev's retreat from the goal of universal secondary education and the timing of the completion of school reform (for 1963) may be attributed largely to population deficiencies in these groups. It is reasonable to speculate, therefore, that Soviet authorities will restrict upper secondary school enrollment in 1962–63 to a proportion under 20 percent of the appropriate age cohort, or a low of less than 2 million. When the crisis is passed, enrollment will again increase.

The decline in additions of youth to Soviet labor, in process since 1956, will be particularly acute in the early 1960's. This estimate is based on the fact that the 12–14 age group in January 1959 was small in number. The degree of imbalance can be determined by narrowing the study to a single age group.

Prior to the release of 1959 census data, a study[76] based on school enrollment figures revealed that since 1957 the number of 18-year-olds has been declining and would continue to decline. This age level is particularly critical because it is the primary source of additions to the Soviet labor force, of candidates for higher education, and for recruits to the armed forces. It was estimated that the diminution in numbers would be notably drastic in 1961–63 when the age group will drop to an annual low of 2.5 million or less, approximately one-half the population of 18-year-olds in the early 1950's.[77]

To be sure, the actual number of 18-year-olds will not be known until the Soviet Government releases further data for individual age groups. But if census figures for the age group 12–14 are taken as a base for projection, without any adjustment for such factors as mortality, the average annual number of 18-year-olds will be approximately 2.8 million in 1963–65. Calculated on the basis of school enrollment, the comparable figure would be 2.7 million. Estimates on chart VI of the 1961–62 population of 18-year-olds, also calculated on enrollment figures, are probably 300,000 to 500,000 less than they should be. The trend nevertheless is confirmed. While an increase in the number of 18-year-olds can be expected in the late 1960's, the figure will still fall short of the number before World War II or in the early 1950's.

[75] *Pravda*, Feb. 4, 1960. See summary in appendix table II–A–5.

[76] N. DeWitt, "The School Reform and Soviet Labor," *Problems of Communism*, vol. VIII, No. 3 (May-June 1959), 62–64 (addendum to "Upheaval in Education," *Problems of Communism*, vol. VIII, No. 1 [January–February 1959], 25–34).

[77] For estimating technique and more detailed data, see appendix table II–A–4.

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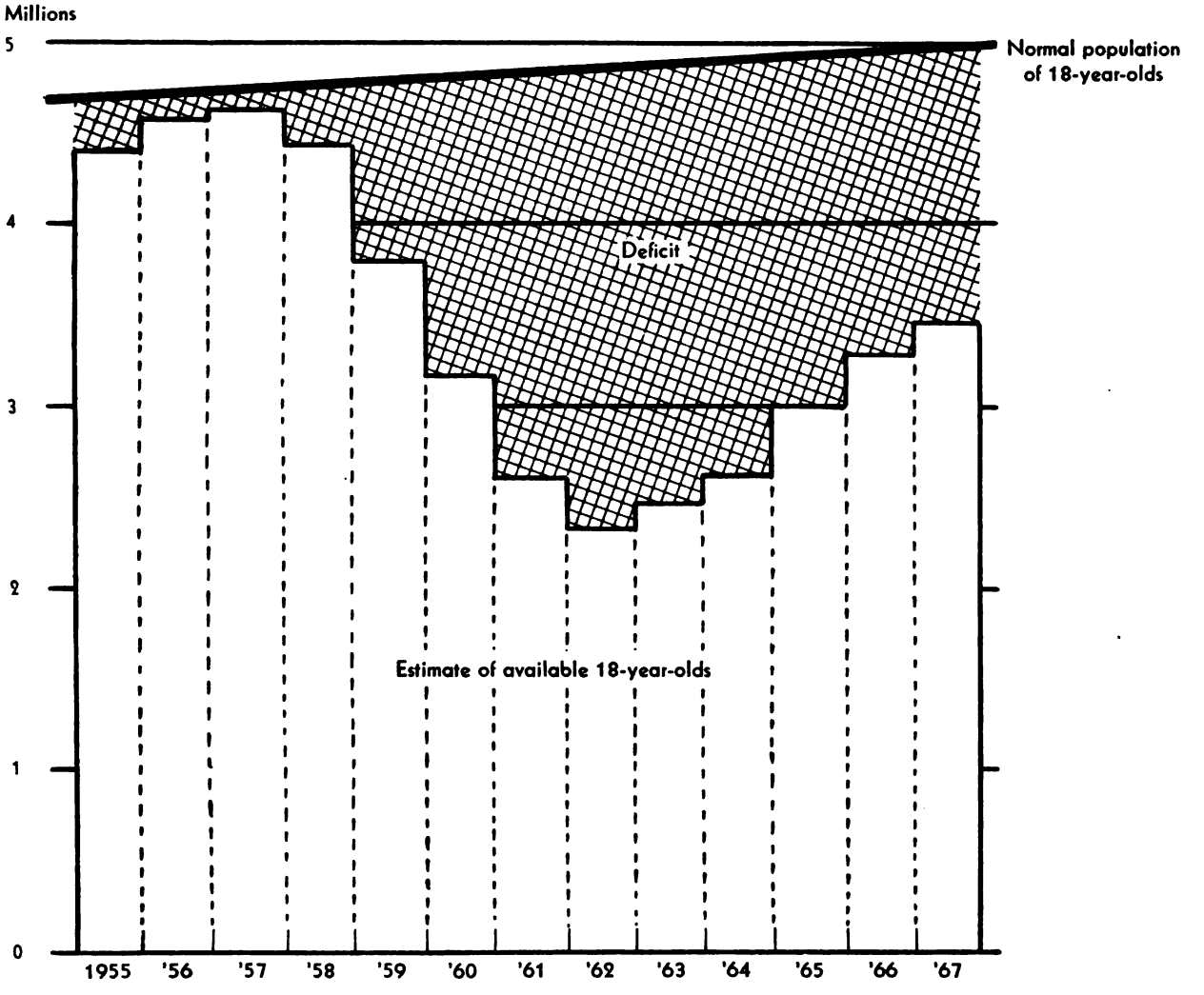
CHART VI.—ESTIMATED NUMBER AND POPULATION DEFICIT OF 18-YEAR-OLDS, 1955–67



Source: Appendix table II–A–4. Hypothetical normal population line is assumed on the basis of the 1926–39 census of population.

The official drive to increase school attendance, coupled with a declining school-age population, has resulted in a marked improvement of rates of school enrollment for the respective age groups. As may be seen in table II–17, the proportion of school-age population actually enrolled increased from 32 percent in 1926 to 80 percent just before the war, and 87 percent in 1958. Ideally, of course, single year factors rather than age groupings should be used to calculate ratios of enrollment to age, but these breakdowns are not available either from the Soviet census or enrollment data. Thus, the correlation of school enrollment to population serves only as an approximation, which nevertheless provides a valuable insight to the process of selectivity which operates in Soviet schools.

From table II–17 it is evident that since the early 1930's, compulsory elementary school education was effectively enforced. While in 1926 some 15 percent of the elementary school age group was not enrolled, in all subsequent years the ratio of enrollment to school-age population ranged from 1:1.1 to 1:1.3. The higher enrollment factor in these ratios reflects a relatively low rate of withdrawals in 1939 and 1958, and

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TABLE II–17.—*Correlation of Soviet school enrollments, by level of grade, with the respective school population age groups, 1926, 1939, and 1958*

[In thousands and percent]

	1926	1939		1958
		a	b	
Elementary school:				
Enrollment grades 1 to 4	9,462	21,202	21,375	17,700
Population, ages 8 to 11	11,226	16,476	20,042	14,982
Percent in school	84.3	128.6	106.6	118.1
Junior secondary school:				
Enrollment grades 5 to 7	1,059	8,780	10,767	8,300
Population, ages 12 to 14	11,521	13,387	17,019	8,565
Percent in school	9.2	65.6	63.3	96.9
Senior secondary school:				
Enrollment grades 8 to 10	136	1,404	2,368	3,400
Population, ages 15 to 17	10,684	9,120	11,241	10,193
Percent in school	1.3	15.4	21.1	33.6
Primary-secondary education:				
Enrollment grades 1 to 10	10,657	31,386	34,510	29,400
Population, ages 8 to 17	33,431	38,983	48,302	33,740
Percent in school	31.9	80.5	71.4	87.1

Sources and notes: Appendix table II–A–3 and appendix table II–A–5.
1926: Enrollment as of fall; population census as of December 1926.
1939a: Enrollment and population census as of January 1939 both within pre-1939 boundaries.
1939b: Enrollment as of 1940; population as of 1939 within post-war boundaries.
1958: Enrollment in the fall; population census as of January 1959.

consequently a 10- to 30-percent differential accountable by the presence of overage pupils enrolled as repeaters in the primary grades.

School enrollment rates showed spectacular increases particularly in the junior and senior secondary schools. In grades 5–7 the rate in 1926, for example, was less than a tenth of the figure in 1958 when almost 97 percent of the age group 12–14 were enrolled. As in the case of the elementary grades, however, this does not represent a true ratio, for the introduction of compulsory 7-year education undoubtedly accounted for an admixing of age groups because of the presence of late starters and repeaters.

Selectivity remained in effect in senior secondary school enrollment despite a more than 25-fold increase in rate over a period of about three decades. From a low of 1.3 percent in 1926, the rate advanced to 21.1 percent in 1939. By 1958 one-third of the 15 to 17 age group was enrolled in grades 8–10.

A question frequently asked is how these school attendance rates compare with those in the United States. For the elementary grades the true attendance rates in the Soviet Union are undoubtedly very little different from those in this country. The 96 percent rate of enrollment in U.S. junior high schools (ages 12–14) [78] is about the same as the *indicated* rate for the Soviet Union, but substantially above (by 15 to 25 percent) the true rate. In the upper grades of secondary school, however, the U.S. enrollment rate is 82 percent: i.e., about four-fifths of all youths aged 15–17 are actually enrolled in school. By contrast, in the Soviet Union only one-third of this age group were attending regular school in 1958. Thus, while the Soviet educational system has scored significant advances in enrollment rates, upper secondary schooling is appreciably less accessible than in the United States. It is at this level that the difference in quantitative indicators of mass education in the two countries is most evident.

Objection may be raised to these comparisons on the ground that other types of secondary schooling, such as secondary specialized (technicum) training, have been excluded from the analysis on the Soviet side. This objection can be met by a more comprehensive comparison of total enrollment in the age group 15–17 with the respective population age cohorts. (The data in table II–18 give the combined enrollments and their correlation with the age group 15–19 in selected years.)

The proportion of the 15- to 19-year-old population enrolled in all types of schools in the Soviet Union increased from 3.8 percent in 1926 to about 24 percent in 1940. Following a negligible decline in 1950, the rate advanced to 43 percent in 1955, then dropped to 35 percent by 1958. An examination of comparable factors in the United States reveals that about 87 percent of the corresponding age group attended high school or college in 1957. Thus educational opportunities for youths of age 15 to 19 in the United States were almost twice that in the U.S.S.R., because of the higher rate of attendance in the United States both at the high-school and college level.

[78] U. S. Dept. of Commerce, Bureau of the Census, *Statistical Abstract of the United States, 1955*, Washington, D. C.: U. S. Government Printing Office, 1955, p. 107. U. S. data are for the 1950 census of population. The biannual censuses of schools since then show a steady rate of about 97 percent.

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TABLE II–18.—*Soviet population of youths aged 15 to 19 and their participation in various levels of schooling, selected years*

[In thousands]

	1926	1939		1950	1955	1958
		a	b			
Upper grades (8 to 10) of regular schools	136	1,404	2,368	1,496	5,253	3,400
Vocational-technical schools	243	242	717	1,300	1,365	904
Full-time day secondary semiprofessional schools (technicums)	180	952	787	1,065	1,470	1,125
60 percent of full-time day higher education students	96	362	334	490	688	708
Total in school	655	2,960	4,206	4,351	8,776	6,137
Population of youths 15 to 19	16,977	15,198	17,757	19,000	20,500	17,530
Percent of population aged 15 to 19 in school	3.8	19.5	23.7	22.8	42.8	34.8

Sources and notes: Enrollment data from appendix tables II–A–1, II–A–3, III–A–1–S, and IV–A–1–S. Population data from appendix table II–A–5.

1926: Enrollment as of the fall; population as of December.

1939a: Enrollment in the fall of 1938 in the U.S.S.R. within pre-1939 boundaries; population as of January 1939 within pre-1939 boundaries.

1939b: Enrollment in the fall of 1940 within the U.S.S.R.'s post-1939 boundaries; population as of January 1939, adjusted to postwar boundaries.

1950, 1955: Enrollment as of the fall; population for the respective age group extrapolated back from 1959 census.

1958: Enrollment as of the fall; population as of January 1959 census.

It should be noted that the 10-fold increase in the proportion of 15–19-year-olds having access to education of one type or another in the U.S.S.R. during the last 30 years represented a significant educational advance. At the same time, however, this development had an inverse effect upon the gainful employment of youth. The proportion of gainfully occupied 15- to 19-year-olds in the Soviet Union was 30 and 26 percent in 1926 and 1938, respectively.[79] The rate in 1958 is not known; but in all probability it showed a further decline. The central purpose of Khrushchev's educational reform is to foster a higher ratio of gainful employment of youths in the 15–19 age group, whose total number is expected to be less than 14 million by 1965. This purpose would be defeated if enrollment is maintained at the 1955 rate, the highest in Soviet history for this age level. It would mean that 64 percent of the 15–19 age group would be engaged in educational pursuits, and that only 36 percent would be available for gainful employment. This is the very trend the Soviet planners have sought to reverse by the school reform and its curtailment of full-time schooling, and the abandonment of the previous Soviet goal of universal secondary education.

It is a matter of speculation whether at some time in the future the Soviet planners will alter the course charted by the educational reforms. It is conceivable that after the emergency has passed and the demand for mass deployment into the labor force has become less urgent, it will be economically feasible to resume the drive toward universal secondary education. While we cannot preclude the possibility, it is unlikely that such circumstances will present themselves before the 1970's.

4. *Summary of Enrollment Trends in the 1950's and Prospects for 1965*

Over the last three decades elementary-secondary school enrollment in the U.S.S.R. has experienced ups and downs. The prewar peak of 34.6 million students has not been matched in the postwar period. Over the 30-year period 1928–58 there was approximately a threefold increase in total enrollment, notwithstanding the disruption of the war and its demographic aftereffects.

Junior secondary school enrollment increased

[79] Lorimer, *op. cit.*, p. 225.

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sixfold, and senior secondary school enrollment multiplied 17-fold. In the 1950's a radical redistribution of school enrollment by level of grade took place due to population losses suffered during World War II. These losses reduced elementary school (1–4) enrollment by one-half during 1948–53, and beginning in 1953 caused the decline in junior secondary school (5–7) enrollment. After 1956, enrollment in the upper grades (8–10) began to fall off despite an energetic campaign to extend secondary schooling.

Examination of postwar enrollment figures for Soviet primary and secondary schools reveals two distinctive features. The first is that the expansion of school facilities increased the availability of primary and secondary education, with the result that the *proportion* of children attending school has been increasing throughout the postwar period. The second is that because of the unfavorable demographic aftereffects of the war, the *absolute number* of pupils attending school, after rising in the immediate postwar years, declined sharply in the 1950's and has since been recovering slowly. Thus, while proportionately more children of the pertinent age groups were getting education, their number in school (and in the population at large) was substantially smaller than before the war.

Of the total enrollment of 33 million pupils in 1949, almost 23 million were in grades 1–4, about 9 million in grades 5–7, and only about 1 million in grades 8–10. By the fall of 1953, primary-grade enrollment had declined to about 12 million. This was the low point resulting from the deficit of births during the war. With the introduction of compulsory 7-year education in 1949, enrollment in grades 5–7 rose to 14 million by 1952. The drive toward "universally available" 10-year education produced a fourfold expansion of enrollment in the upper grades, and by 1953 there were 4.5 million pupils in grades 8–10.

By 1956 total enrollment had declined to about 28 million. Elementary grade enrollment increased a little to 15.6 million, but intermediate-grade enrollment sagged to a low of about 7 million. In the upper grades 8–10 there were still about 5 million pupils. From 1957 on, both elementary and intermediate-grade enrollments improved gradually.

To sum up this pattern of change in enrollments, we note a drastic decline in the elementary grades after 1950, reaching a low point in 1953 and subsequently showing a slow recovery. The deficit in school-age population then moves on to successively higher grades so that in 1957 enrollment in grades 5–7 was only half as large as in 1952. Upper-grade enrollment increased steadily until 1955, and then it, too, began to decline. It fell off to 2.6 million by 1959, when students numbered only 2.7 million as compared to 5.3 million in 1955. (This was the reverse of the situation in the United States where the war and postwar crop of babies began to flood the schools in the 1950's.)

What is the relation of these enrollment trends to some of the characteristic features of Soviet primary and secondary education? Until about 1950, the upper-grade enrollment could be regarded as a highly select group preparing for higher education. In 1949, for example, it represented about 3 percent of the total primary and secondary school enrollment. By 1955, however, it accounted for almost one-fifth of total enrollment.

Official Soviet sources anticipate that upon completion of the school reform, the 1965 school enrollment in grades 1–8 will reach 36 million, or about 10 million more than the number in grades 1–7 in 1958. Even if this increase is realized, however, the growth will be only nominal if compared to "normal" years not affected by such extensive birth deficits, i.e., 1940. The 1965 gain in grades 1–8 would be only about 10 percent compared with the 1940 enrollment in grades 1–7. The enrollment goal is a feasible one, though it may be difficult to attain, since to attain it means a 90 percent rate of enrollment of children,[80] a rate which the Soviet educational system has not achieved at any time in the past.

In view of the sweeping reorganization of the Soviet educational system, it is very hard to place credence in "projections" of future enrollments. The Soviet authorities are habitually prone to predict future gains. These predictions for 1965 have been summarized in table II–19

[80] The annual number of births has averaged about 5 million since 1950, and thus there could conceivably be 40 million children in the pertinent age group.

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TABLE II–19.—*Regular and alternative equivalent primary and secondary school enrollment in the U.S.S.R., 1940, 1950, 1955, 1958, and 1965 projection*

[In thousands]

Type of school	1940	1950	1955	1958	Officially anticipated 1965	Type of school
Regular primary-secondary:						Labor-polytechnical general education schools:
Grades 1 to 7.....	32,416	31,818	22,964	26,167	36,000	Grades 1 to 8.
Grades 8 to 10.....	2,368	1,496	5,253	3,400	4,500	Grades 9 to 11.
Schools for working and rural youth:						Evening and alternating shift schools:
Grades 8 to 10 *only*..	none	341	906	1,295	[a]3,700	Grades 9 to 11 *only*.
Total, secondary school and equivalent.....	2,346	1,837	6,159	4,695	8,200	Total, secondary school and equivalent.

[a] In addition, there will be 1,100,000 enrolled in the lower grades of these schools.

Sources: *KS–1956*, p. 76; *NarKhoz–1959*, p. 806; *Pravda*, Dec. 24, 1958 (Kairov's speech). See appendix table II–A–1 for data for other years.

for schools of the U.S.S.R., and in table II–20 for schools of the Russian SFSR. In addition to the anticipated enrollments for 1965, the tables present actual data for earlier years. It is very important to note that, in making the projection, alternative equivalent schools, i.e., schools for working and rural youth, have to be considered together with regular primary and secondary schools; for under the new educational system they are merged into a unified school network. Although secondary labor polytechnical schools with production training have been treated in these tables as "regular" school establishments, alternating-shift and evening schools also can no longer be left out as "nonregular" facilities. Official Soviet sources claim that as a result of the educational reform, secondary school enrollment will approximately double. Thus it is necessary to make sure what is meant by the new concept of secondary schooling. Tables II–19 and II–20 represent an attempt to dispel the element of statistical manipulation, for they compare on the secondary school level (1) regular schooling in grades 8–10 only with future enrollments in grades 9–11 only, and (2) enrollment in schools for working and rural youth with future enrollments in alternating-shift and evening schools.

The predicted figure for upper-grade (9–11) enrollment in "regular" schools of the U.S.S.R. is 4.5 million by 1965, or about the same as in 1957 in grades 8–10. Enrollment in grades 9–11

TABLE II–20.—*Regular and alternative equivalent primary secondary school enrollment in the Russian SFSR, 1940, 1950, 1955, 1958 and 1965 projection*

[In thousands]

Type of school	1940	1950	1955	1958	Officially anticipated 1956	Type of school
Regular primary-secondary:						Labor-polytechnical general education schools:
Grades 1 to 7.....	18,769	17,728	12,356	14,600	20,000	Grades 1 to 8.
Grades 8 to 10.....	1,369	793	2,862	1,700	2,700	Grades 9 to 11.
Schools for working and rural youth:						Evening and alternating shift schools:
Grades 8 to 10 *only*..	none	200	534	748	[a]1,900	Grades 9 to 11 *only*.
Total, secondary school and equivalent.....	1,369	993	3,396	2,448	4,600	Total, secondary school and equivalent.

[a] In addition, there will be 750,000 enrolled in the lower grades of these schools.

Sources: *KS–RSFSR–1958*, p. 204; *NarKhoz–RSFSR–1959*, pp. 446, 449; *Izvestia*, Apr. 15, 1959 (Afanasenko's speech).

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will still be short, by 750,000, as compared with the all-time high of 5.3 million in 1955. The intermediate years are most important, however, for upper-grade enrollment will almost certainly be at a new low in 1960–63. But by aggregating the enrollment to include schools for working and rural youth, which now become alternating-shift and evening schools, the decline which will occur in regular secondary schools will thus be camouflaged and appear instead as a numerical gain. Indeed, the entire increment in secondary school enrollment planned for 1965 can be explained by the inclusion in the new reporting of students in former schools for working and rural youth, who were previously not counted in "regular" school enrollment statistics.

5. *Rural-Urban Differences in Educational Opportunities*

There is a very marked disparity in the availability of educational facilities in urban and rural areas of the Soviet Union. Teacher-student ratios, volume of school facilities, and training of teachers are all quantitatively superior in urban areas. The contrast is illustrated by the enrollment data in table II–21 for 1939 and table II–22 for 1958. In 1939 about 67 percent of the Soviet population was rural.[81] The data

TABLE II–21.—*Differences in urban and rural enrollments in the U.S.S.R in 1939*

Grades	Total enrollment (thousands)	Urban enrollment		Rural enrollment	
		Thousands	Percent of total	Thousands	Percent of total
1 to 4.....	20,472	5,165	25.2	15,307	74.8
5 to 7.....	9,715	3,578	36.8	6,137	63.2
8 to 10.....	1,871	1,104	59.0	767	41.0
Total, 1 to 10...	32,058	9,847	30.7	22,211	69.3

Source: *Kul't Stroi–1940*, p. 246. See appendix table II–A–3 for rural-urban enrollments in other years.

in Table II–21 indicate that the share of rural enrollment in grades 1–10 in 1939 was about 69 percent of the total enrollment in Soviet primary and secondary schools, or about the same as the proportion of rural population to total U.S.S.R. population. In grades 1–4 rural school

[81] Lorimer, *op cit.*, p. 241; *NarKhoz–1959*, p. 9.

TABLE II–22.—*Differences in urban and rural enrollments in the U.S.S.R. in 1958*

Grades	Total enrollment (thousands)	Urban enrollment		Rural enrollment	
		Thousands	Percent of total	Thousands	Percent of total
1 to 4.....	17,700	7,600	43.9	10,100	57.1
5 to 7.....	8,300	4,100	49.4	4,200	51.6
8 to 10.....	3,400	1,900	55.9	1,500	44.1
Total, 1 to 10...	29,400	13,600	46.2	15,800	53.8

Source: Appendix table II–A–3.

enrollment surpassed urban school enrollment by a ratio of 3 to 1. In grades 5–7 the proportion of rural school enrollment was less than the proportion of rural population to total U.S.S.R. population. Finally, in the upper grades (8–10), urban schools accounted for about 59 percent of all enrollment, almost the reverse of the rural-urban population distribution ratio.

According to the 1959 census, rural population constituted 48 percent of the total population. By 1958 there was a marked improvement in school attendance in rural areas, but on the other hand various decrees of the Soviet Government in the 1950's concerning universal 7-year education and the expansion of 10-year education placed priority emphasis on urban schools. Numerous stories in Soviet newspapers continued to point out that enrollment in the intermediate and upper grades in rural schools lagged below target quotas, that many who registered did not attend, and that schools were not accessible. As far as enrollment in the senior secondary grades is concerned, there was still a lag, and only 44 percent of upper-grade students were in rural schools.

In this connection it is worth noting that the rate of expansion in intermediate and upper-grade enrollment in rural areas over the last 30 years has undoubtedly been greater than in the cities simply because the initial base was smaller. Soviet statements frequently refer to the higher rates of expansion of enrollment in rural areas as if to counterbalance admitted shortcomings. Gains have been made, to be sure; but today, as in the past, secondary school enrollment in rural areas remains disproportionately low in relation to population.

There are three main reasons for the sharp differences in rural-urban enrollments at various

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levels of the Soviet school. One is simply the lack of facilities, and another is the probable lack of motivation among rural youth for attending school. The third and probably most important reason is the enormous economic pressure upon the Soviet collective farmers, which makes it necessary for young boys and girls to engage in agricultural work at an early age.

In regard to rural-urban differences, another important development should be pointed out. Appendix table II–A–3 gives annual data for rural-urban enrollments for the postwar years, showing how the wartime birth deficits affected enrollments by grade level in the cities as compared with rural areas. The fall-off in postwar enrollments was substantially greater in rural areas than in the cities. During the actual war years, there was a slightly greater decline in urban (27 percent from 1940 to 1945) than in rural (24 percent) school enrollment, but the post-1950 effects of the wartime birth deficits were more heavily felt in rural areas. This is reflected in comparative elementary school enrollments. While urban elementary school enrollment dropped 40 percent from the 1948 postwar high to the low of 1953, rural elementary enrollment fell 50 percent.

During the 1950–55 period, when total elementary-secondary school enrollment was falling off, urban school enrollment increased and, by 1955, surpassed the prewar level. Meanwhile, rural school enrollment decreased considerably from 1949 (21.7 million) to 1956 (15.7 million). Thus, it is apparent that the drop in overall enrollment in the period 1950–55 was largely attributable to the decline in rural enrollment.

The opposite trends in postwar school enrollments in urban and rural areas probably reflect, in part, shifts of population from the rural areas to urban centers, particularly in areas which suffered heavy war devastation or were under German occupation. Examination of the data suggests that the populations of cities evacuated during the war were rapidly replenished by postwar movements of population from the country. Thus, the population deficit resulting from the war, which was heavier in rural areas than in the cities, was further intensified by the shift of population into the cities.

6. *Male-Female Differences in School Enrollment*

One of the demographic effects of the war in the Soviet Union was the emergence of a substantial disparity between male and female population. The 1959 Soviet census revealed that females outnumbered males by about 20 million, or by a ratio of 55 to 45.[82] In the population under age 19, however, the sex ratio is about in normal balance, with a ratio of 50.7 males to 49.3 females. Despite this, as indicated by the data in table II–23, the ratio of female enrollment is higher than that for males in grades 8–10.

The above figures show that the proportion of females in total school enrollment has increased over the last 30 years. They also indicate that since 1950, female enrollment in the upper secondary grades has been at the level of about 55 percent of total enrollment as against 45 percent of males, probably reflecting, in part,

[82] *Pravda*, Feb. 4, 1960.

TABLE II–23.—*Proportion of females among pupils in Soviet primary and secondary schools, 1927, 1938, 1950, and 1955*

[In percent]

Year end	Total				Urban				Rural			
		By grade				By grade				By grade		
	Total	1 to 4	5 to 7	8 to 10	Total	1 to 4	5 to 7	8 to 10	Total	1 to 4	5 to 7	8 to 10
1927.....	39.6	38.7	44.3	.....	48.1	47.1	49.1	.....	36.2	36.8	31.6	.....
1938.....	47.5	47.5	47.1	.....	49.4	47.9	50.8	.....	46.8	47.3	45.2	.....
1950.....	.....	.....	.....	54.5	.....	.....	.....	57.4	.....	.....	.....	50.7
1955.....	49.6	47.9	48.7	55.4	51.2	48.3	50.2	58.2	48.3	47.7	47.8	51.9

Sources: *Kul't Stroi–1940*, p. 65; *KS–1956*, pp. 176–177; *Vestnik statistiki*, No. 6, June 1956, p. 96.

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the tendency among males to enter the labor force at an earlier age.[83] This parallels exactly the situation in the United States, where the girl-boy ratio among those graduating from high school is also 55:45.[84] In the Soviet Union, the 1955 ratio of girls to boys in the upper secondary grades was higher in urban than in rural schools: i.e., 58:42 as against 52:48.

Although more girls than boys complete secondary schooling in the U.S.S.R. as a whole, there are very significant regional variations in the ratio, largely reflecting the persistence in some areas of traditional ways of life even 40 years after the Revolution. Table 11–24 demonstrates these differences. It is apparent from the figures that particularly in the Central Asiatic republics (Turkmen, Tadzhik, Kirgiz, Uzbek), the ratios of female enrollment in the upper secondary school grades are considerably below the national average, indicating that some of the sustoms of the native Moslem population still persist. Soviet press reports indicate that there have been difficulties in retaining girls of the local nationality in secondary school.[85] It may be noted in this connection that the 1958 school reforms[86] include special provisions emphasizing the need for separate boarding school facilities for girls in these areas. These provisions appear indicative of a renewed effort by the Soviet regime to break the hold of traditional Moslem custom of early marriages or retention of girls in the home.

[83] In 1959 there were 29.2 million females with completed or partial secondary education, as against 25.7 million males (*Pravda*, Feb. 4, 1960), giving a female/male ratio of 53:47.
[84] D. Wolfle, *America's Resources of Specialized Talent*, p. 163.
[85] *Turkmenskaia iskra*, June 28, 1958, Oct. 7, 1960.

TABLE II–24.—*Proportion of females among pupils in the upper grades (8 to 10) of Soviet secondary schools, by union republic, 1955*

[In percent]

	Total	Urban	Rural
Russian SFSR	59.2	60.3	57.6
Ukrainian SSR	*54.3	56.1	52.6
Belorussian SSR	55.9	57.8	54.5
Uzbek SSR	*32.6	48.0	25.7
Kazakh SSR	*49.6	53.9	46.1
Georgian SSR	*53.4	55.5	51.8
Azerbaidzhan SSR	*41.5	50.8	33.5
Lithuanian SSR	61.4	61.2	61.7
Moldavian SSR	*53.9	55.9	52.8
Latvian SSR	62.5	62.4	62.7
Kirgiz SSR	*42.8	53.0	36.1
Tadzhik SSR	*30.4	42.2	21.8
Armenian SSR	*51.6	58.0	46.2
Turkmen SSR	*37.7	42.0	33.7
Estonian SSR	61.8	61.7	62.7
U.S.S.R.	55.4	58.2	51.9

* Below national average.
Source: *Vestnik statistiki*, No. 6, June 1956, p. 96.

7. *Implications of Recent Enrollment Trends for "Educational Opportunity" in Upper Secondary Schools*

If enrollments in the top three secondary grades (8–10), expressed in percentages of total regular school enrollment, are taken as indices of "educational opportunity," an interesting trend may be observed. It is true that upper-grade enrollment, in absolute numbers and in relation to total enrollment, expanded for each individual republic and for the U.S.S.R. as a whole, with the proportion increasing from 4.5 to 18.7 percent. However, it is apparent from the data in table II–25 that a number of republics which in 1950 enjoyed a higher proportion of upper-grade students than the national average had lost ground by 1955. Thus, while upper-grade educational opportunity expanded, the growth was uneven.

The figures given below show considerable variations in the percentages of upper-grade enrollment in individual republics, probably resulting from the varying local impact of demographic trends and other factors. In a number of republics, particularly those of Central Asia and the Baltic provinces, upper-grade enrollments registered increases between 1950 and 1955 which were disproportionate to the overall increase in such enrollment in the Soviet Union as a whole. Soviet authorities claim that upper-grade enrollment in the Central Asian republics more than tripled during the period 1950–55.[87] However, considering that total school enrollments in some of these republics showed slight increases in contrast to decreases in the RSFSR and other republics, the increases in upper-grade enrollments were comparatively smaller than they should have been. To keep pace with the U.S.S.R. as a whole, the increases should have been at least fourfold.

[86] Appendix I–ERL.
[87] See especially *Dos–1957*, pp. 287–324.

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TABLE II–25.—*Rates of enrollments in upper grades (8 to 10), by republic, 1950 and 1955*

Republic	1950			1955		
	Total	Grades 8 to 10	Proportion in grades 8 to 10	Total	Grades 8 to 10	Proportion in grades 8 to 10
	Thousands	Thousands	Percent	Thousands	Thousands	Percent
Russian	18,521	793	*4.28	15,217	2,862	18.81
Ukrainian	6,824	273	*4.00	5,504	1,103	20.03
Belorussian	1,497	58	*3.87	1,215	219	*14.63
Uzbek	1,264	58	*4.58	1,287	229	*17.79
Kazakh	1,346	49	*3.64	1,295	209	*16.13
Georgian	713	94	13.18	675	188	27.85
Azerbaidzhan	621	39	6.28	592	109	*18.41
Lithuanian	415	32	7.71	408	54	*13.23
Moldavian	412	11	*2.67	349	35	*10.02
Latvian	280	20	7.14	271	42	*15.50
Kirgiz	329	17	5.17	310	52	*16.77
Tadzhik	309	9	*2.91	320	39	*12.18
Armenian	302	19	6.29	280	58	20.71
Turkmen	218	11	5.05	225	33	*14.66
Estonian	148	11	7.43	149	21	*14.09
U.S.S.R. total	33,197	1,496	4.51	28,100	5,253	18.69

* Rate lower than national average.
Source: *KS—1956*, pp. 122–131.

From the regional point of view, recent enrollment trends suggest that the Russian and Ukrainian republics have been relatively better off in terms of opportunity for pupils to obtain upper secondary education. The Armenian and Georgian republics, while losing some ground, continued to show upper-grade enrollment percentages above the national average. In most other republics, upper-grade enrollment did not expand as rapidly, and the proportion of upper-grade students continued to lag significantly behind the national average.

8. *Enrollment in Soviet Primary and Secondary Schools by Type of School*

The preceding discussion of enrollment trends has focused primarily on the distribution of pupils by grade levels since this is of fundamental importance to an analysis of the Soviet position and prospects with respect to supply of trained manpower. Soviet official sources, however, often break down total enrollment by classes of schools. Prior to the current educational reform, regular elementary and secondary schools were of three types: (1) Elementary schools with grades 1–4 only; (2) 7-year schools with elementary and junior secondary grades 1–7; and (3) 10-year schools with all grades through senior secondary.

Data on the number of schools are presented in appendix table II–F–1.[87a] In 1959 over one-half of all schools (199,000) were elementary (112,000). There were 57,000 7-year schools and 30,000 10-year schools. The number of 7- and 10-year schools has increased rapidly over the last 30 years.

Appendix table II–A–2 provides enrollment data by type of school, showing a steady shift to "complete elementary-secondary," or 10-year schools. In 1928, such schools accommodated less than 10 percent of total elementary-secondary enrollment, but by 1958 the percentage was officially claimed to be about 55 percent, as seen in table II–26. There was a parallel decline of enrollment in 4-year elementary schools as these schools were amalgamated into 7- or 10-year schools. Enrollments in both the latter increased continuously until the effects of the adverse postwar demographic trend were felt in the early 1950's.

It should be noted, however, that a major part of the enrollment in both 7-year and 10-

[87a] In the fall of 1960 there were 199,200 regular primary and secondary schools, and 25,200 schools for working and rural youth and for adults. (*SSSR—Tsif—1960*, p. 306.)

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TABLE II–26.—*Composition of Soviet primary and secondary school enrollment, by type of school and level of grade, year end 1956*

Level of grades	Enrollment by type of school (millions)				Percent
	Elementary	7-year	10-year	Total	
1 to 4	4.1	(5.1)	(6.4)	15.6	55.5
5 to 7	none	(3.5)	(4.0)	7.5	26.7
8 to 10	none	none	5.0	5.0	17.8
1 to 10, total	4.1	8.6	15.4	28.1	100.0
Percent	14.6	30.6	54.8	100.0	

Source: *NKh–1957*, pp. 245–246. Figures in parentheses indicate the estimated allocation of pupils on the basis of data for the Russian SFSR.

year schools, as of 1956, was composed of pupils in the elementary grades.

Under the current educational reform program, all 7-year schools, as well as an unspecified but probably substantial number of 10-year schools are to be converted into 8-year schools.[88] The new school structure will also include regular secondary schools "with production training," having grades 9–11, to be set up as independent units; and some complete 11-year schools combining all grades. The new division of regular Soviet schooling into two basic units of 8 years (elementary, junior secondary) and 3 years (secondary) structurally resembles the formerly common U.S. system of 8-year elementary and 4-year high schools. Despite various proposals that all remaining Soviet 4-year elementary schools be converted into 8-year schools, it appears likely that 4-year schools will be retained in rural areas for some time at least.

9. *Average Size of School and Related Problems*

The following tables present Soviet data concerning the operational features of the Soviet school system, such as the average number of pupils enrolled per school (table II–27), the distribution of schools by number of teachers and pupils by type of school and number of grades (tables II–28, II–29, II–30, II–31, II–32, and II–33), and the number of teaching shifts (table II–34).

Analysis of the data presented in the tables below brings out a number of points. First of all, they show that most Soviet schools are relatively small in terms of enrollment. At the

[88] See appendix I–ERL.

TABLE II–27.—*Average number of pupils enrolled per primary and secondary school in the U.S.S.R. for selected years*

	1940–41	1950–51	1953–54	1955–56
Primary or 4-year school (grades 1 to 4):				
Total	78	59	33	33
Urban	198	179	115	114
Rural	71	50	27	27
Primary—junior secondary or 7-year school (grades 1 to 7):				
Total	274	260	198	160
Urban	452	503	399	350
Rural	253	226	172	137
Primary—complete secondary or 10-year school (grades 1 to 10):				
Total	648	680	633	563
Urban	801	857	819	757
Rural	512	504	476	409

Source: *KS–1956*, p. 161.

TABLE II–28.—*Distribution of Soviet elementary schools, by number of teachers, 1954–55*

	Urban	Rural	Total	Percent of total
With 1 teacher	1,131	61,514	62,645	57.3
With 2 teachers	1,117	34,441	35,558	32.6
With 3 teachers	470	4,301	4,771	4.4
With 4 teachers	2,874	3,362	6,236	5.7
Total number of schools	5,592	103,618	109,210	100.0

Source: *KS–1956*, p. 165.

TABLE II–29.—*Distribution of Soviet elementary schools, by number of pupils, 1954–55*

	Urban	Rural	Total	Percent of total
Less than 10	133	12,359	12,492	11.4
10 to 15	351	21,006	21,357	19.6
16 to 20	335	17,204	17,539	16.0
21 to 30	431	18,907	19,338	17.7
31 to 40	541	18,883	19,424	17.8
41 to 80	916	13,045	13,961	12.8
81 to 160	1,192	1,944	3,136	2.9
161 to 320	1,081	235	1,316	1.2
321 and more	612	35	647	0.6
Total number of schools	5,592	103,618	109,210	100.0

Source: *KS–1956*, p. 165.

TABLE II–30.—*Distribution of Soviet 7-year schools by number of individual classes, 1954–55*

	Urban	Rural	Total	Percent of total
Up to 9	1,528	45,031	46,559	78.2
10 to 13	2,113	7,603	9,716	16.3
14 to 16	983	818	1,801	3.0
17 to 19	728	250	978	1.6
20 to 22	272	61	333	0.6
23 to 29	122	28	150	0.3
30 and more	13	6	19	0.0
Total number of schools	5,759	53,797	59,556	100.0

Source: *KS–1956*, p. 165.

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TABLE II–31.—*Distribution of Soviet 7-year schools, by number of pupils, 1954–55*

	Urban	Rural	Total	Percent of total
100 and less	253	13,663	13,916	23.4
101 to 200	816	28,041	28,857	48.4
201 to 280	741	8,265	9,006	15.1
281 to 400	1,633	3,234	4,867	8.2
401 to 560	1,217	517	1,734	2.9
561 and more	1,099	77	1,176	2.0
Total number of schools	5,759	53,797	59,556	100.0

Source: *KS–1956*, p. 167.

TABLE II–32.—*Distribution of Soviet 10-year schools, by number of individual classes, 1954–55*

	Urban	Rural	Total	Percent of total
Under 13	590	4,305	4,895	20.4
14 to 16	711	3,328	4,039	16.8
17 to 19	1,681	2,781	4,462	18.6
20 to 22	1,824	1,670	3,494	14.5
23 to 29	2,827	1,438	4,265	17.7
30 and more	2,507	368	2,875	12.0
Total number of schools	10,140	13,890	24,030	100.0

Source: *KS–1956*, p. 167.

TABLE II–33.—*Distribution of Soviet 10-year schools, by number of pupils, 1954–55*

	Urban	Rural	Total	Percent of total
400 and less	670	6,061	6,731	28.0
401 to 800	4,903	7,083	11,986	49.9
801 to 880	893	388	1,281	5.3
881 to 1200	2,597	338	2,935	12.2
1201 and more	1,077	20	1,097	4.6
Total number of schools	10,140	13,890	24,030	100.0

Source: *KS–1956*, p. 167.

TABLE II–34.—*Number of teaching shifts in regular Soviet schools, 1955–56*

	Total	Urban	Rural
Total number of schools	194,358	25,391	168,967
Number operating on—			
1 shift	91,962	3,991	87,971
2 shifts	101,003	20,249	80,754
3 shifts	1,393	1,151	242
Total number of pupils	28,100,704	12,031,879	16,068,825
Percent attending—			
1st shift	63.0	55.5	68.5
2d shift	36.5	43.4	31.4
3d shift	0.5	1.1	0.1

Source: *KS–1956*, p. 169.

same time, however, there is a wide gap between the average size of schools in rural and urban areas. Of the total number of regular primary and secondary schools (193,000 in 1954-55), 88 percent were rural schools. Of these 171,000 rural schools, 60 percent (103,618) were 4-year schools and of these, 60 percent were schools with a single teacher.

In urban areas, 7-year schools predominate. Their average size (350 pupils per school) in 1954-55 was twice as large as that in rural areas (137 pupils per school). About 78 percent of all 7-year schools had 9 classes or less, indicating that only a couple of grades—probably elementary—were divided into more than one class. This did not hold true for a few large schools, particularly in urban areas. Ten-year schools were more numerous in rural areas (14,000) than in the cities (10,000), and rural schools on the average were one-third smaller (median number of pupils in rural schools—450; in urban schools—750) in terms of enrollment. The median number of individual classes in 10-year schools was about 18, suggesting that there were not usually more than two classes of the same grade except, again, in large urban schools.

About 60 percent of all schools operated two shifts—one-half of the rural schools and about 80 percent of the urban schools. A few schools operated three shifts. In rural areas 68 percent of all pupils were enrolled in the morning shift, while in the cities the ratio of morning to afternoon shift enrollment was about 5:4.

10. *The Process of Selection*

In the Soviet educational system, the process of academic selection is of particular importance because it is the means whereby the Soviet authorities actually restrict the privilege of extensive education to the few students who are best fitted. The remaining many are given only what Stalin described as "education sufficient to make them active participants in social development." [89] It is the system of selection which, in effect, determines who is to enjoy maximum educational opportunity and who is to receive merely "sufficient" education.

[89] I. Stalin, *Ekonomicheskie problemy sotsializma* (Economic Problems of Socialism), Moscow, 1952, pp. 68–69.

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The heavy curriculum, strict examination and grading procedures, the system of promotion based on the requirement of passing grades in all subjects—all of these factors account for what an American who attended a Soviet 10-year school has called "a pace of schoolwork far more rigorous than any encountered in the United States."[90] He was referring to the situation in the late 1930's when many of the present selection devices were already in operation.

The effect of the system of selection may be illustrated by data showing the percentages of students who succeed in winning promotion from grade to grade as well as percentages of students in school at the end of the year in a given grade in relation to the number of students in that grade at the beginning of the year. Table II–35 shows these percentages for the academic years 1937–38 and 1954–55.

TABLE II–35.—*Retention rate and promotion rate in Soviet primary and secondary schools, 1937–38 and 1954–55*

Grade	(A) Annual retention rate		(B) Annual promotion rate	
	1937–38	1954–55	1937–38	1954–55
1.....	93.4	97.0	89.9	92.6
2.....	96.9	98.1	91.5	92.4
3.....	96.0	97.0	88.7	89.3
4.....	95.1	95.2	78.8	83.4
5.....	90.7	91.0	73.5	74.1
6.....	93.0	92.1	75.0	79.3
7.....	94.0	93.8	75.9	84.7
8.....	75.8	83.7	72.9	78.1
9.....	80.7	92.0	77.7	82.9
10.....	91.8	95.8	88.6	95.5

Sources: *Kul't Stroi–1940*, p. 78; *KS–1956*, pp. 172–175.

(A) Annual retention rate: Students in school at the end of the year in a given grade in percent of the number in that grade at the beginning of the year. (The dropout rate would be 100.0 minus the retention rate. These statistics do not allow for dropouts in the summer.)

(B) Annual promotion rate: Percent of students at the end of the year who were promoted to the next grade (or graduated).

The data for 1937–38 reveal that from 4 to 9 percent of the pupils originally enrolled in most grades dropped out of school before the end of the academic year, and that the percentages were substantially larger (25 and 20 percent, respectively) in grades 8 and 9. Promotions to the next grade were about 90 percent in grades 1 through 3, but only about 70 to 80 percent in grades 4 through 9. By the 10th grade, most of the less fit had already been eliminated, so that graduations were close to 90 percent. In 1954–55 the retention rates were lowest in grades 5 and 8, the transition grades from elementary to junior secondary, and from junior secondary to senior secondary school, respectively. In both these grades also, the promotion rates at the end of the year were noticeably lower.

Study of the actual progression of pupils in Soviet primary and secondary schools is severely handicapped by the lack of adequate statistics. It is known that the Soviet Government regularly compiles data on initial enrollment in, and promotions from, each school grade, with particular attention to promotions from the "terminal grades" of the successive school "units" (i.e., grades 4, 7 and 10) and admissions into the starting grades of these units (i.e., grades 1, 5 and 8).[91] This information, however, is as a rule not made public, and has been omitted from all recently published (1956-60) Soviet statistical handbooks. Instead, data similar to those in table II-35 are released, but such data do not reveal the dropout rates of pupils between individual grades, and thus do not show how many pupils continue, for example, from the 4th to the 5th grade, or the 7th to the 8th, etc. Only on rare occasions, and usually only for the schools of a particular region, have these data been released in recent years.[92] For example, detailed statistics are available for the years 1950–57 for the Mordvin ASSR,[93] and provide interesting material for analysis.

[90] G. Fischer, "My Soviet School Days," *The Reporter*, vol. I, No. 9 (Aug. 16, 1949), 5.

[91] The reporting procedures and standard statistical reporting forms (especially RIK–75, RIK–76A) may be found in I. M. Bogdanov, *Statistika shkol'nogo obrazovaniia* (Statistics of School Education), Moscow, 1954, especially pp. 71–80.

[92] *NarObr RR–1944* and *NarObr RR–1945* have comprehensive data of this sort, but for the war years only.

[93] F. F. Sovetkin (ed.), *Natsional'nye shkoly RSFSR za 40 let* (National Schools of the RSFSR during 40 Years), Moscow, 1958, p. 149. The Mordvin ASSR is in the heart of European Russia, with Saransk as its capital. The 1956 population was about 1 million. In 1950 school enrollment was about 200,000, but by 1957 it had declined to about 150,000. Russian is the language of instruction in schools accounting for 77 percent of total enrollment, the remaining schools teaching in Mordvin.

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On the basis of these statistics, the following observations may be made. If the published numbers of first-grade entrants for four consecutive years are totaled, we find that the total is some 15 percent less than the announced figure for total enrollment in the elementary grades. This suggests that there were a substantial number of repeaters, which, as pointed out earlier, was also indicated for the country as a whole by a correlation of school enrollment and population data (i.e., 118 percent). Largely as a consequence of the continuing presence of repeaters, the number of pupils completing the 4th grade frequently exceeded the number which had entered the 1st grade 4 years earlier by between 5 and 10 percent. About 98 percent of those completing the 4th grade continued on to the 5th grade.

Extensive school dropouts occurred in grades 5–7. The announced aggregate enrollment in these grades was 25 to 35 percent less than the sum of the figures given for admissions to the 5th grade in the three preceding years. The annual number of graduates from the 7th grade ranged from 65 to 75 percent of the initial number of pupils admitted to the 5th grade. The significant cutoff point came after completion of the 7th grade, when only about 65 percent continued on to the 8th grade.

Finally, the announced aggregate enrollment in grades 8–10 was some 40 percent less than the sum of the figures for admissions to the 8th grade in the three preceding years, and the number of graduates from the 10th grade was only about 55 percent of the initial entries into the 8th grade. This evidence may be summed up as follows:

Entering 1st grade (base)	100
Completing 4th grade (though some with delay)	100
Entering 5th grade	98 plus
Completing 7th grade	65–75
Entering 8th grade	42–50
Graduating from 10th grade	23–27

Thus, the official statistics for the Mordvin ASSR indicate that, in the period covered, about two-thirds to three-fourths of the children who entered elementary school completed the 7th grade; that slightly less than half continued on to the 8th grade; and that about one-fourth of those entering the first grade eventually graduated from the 10th.[94]

On the national level, the annual retention and promotion rates presented earlier give only a static picture of student performance for a particular year. The actual dynamic process results in a somewhat different set of rates. On the basis of actual figures for entrants and graduates in various years, true success rates for the U.S.S.R. at large can be arrived at as follows. In the fall of 1930 there were about 5,798,000 pupils in the 1st grade,[95] and in 1940 about 285,000 students were graduated from regular 10-year schools.[96] Thus, only 49 students per 1,000 who entered the first grade in 1930 completed regular 10-year school in 1940. Of course it should be noted that these figures do not include technicum graduates. If the latter are included, there were about 70 graduations in 1940 per 1,000 school entrants in 1930.

From data for the Russian SFSR, which accounts for about 60 percent of total school enrollment in the U.S.S.R., 114 graduations in 1954 per 1,000 1st grade entrants in 1944 can be computed (with technicum graduates not included).[97]

The number entering the 1st grade in 1946 in the U.S.S.R. was 5.5 million and graduations in 1956 were 1.2 million,[98] which gives an actual success rate of about 21 percent. Furthermore, in 1958, when Soviet regular 10-year schools graduated a record total of 1,340,000, the actual success rate reached almost 25 percent based on the number of 1st grade entrants in 1948. Interestingly enough, this is not a significantly different rate from that observed for the Mordvin ASSR.

It is evident that there was an important turning point in the dynamics of the selection process in about 1954. Since then, twice to three times as many students have been getting through the upper grades as formerly. Although the retention rates for 1950-51 and

[94] It is reported that in another regional unit, the Moldavian SSR, 60 to 70 percent of those who entered 1st grade completed the 7th (*Sovetskaia Moldavia*, Jan. 31, 1958).

[95] *NarKhoz–1932*, p. 520.

[96] Appendix table II–C–1.

[97] 1944 enrollment in the 1st grade was 3,728,000 (*NarObr RR–1944*, p. 171). Anticipated graduations in the RSFSR in 1954 were about 470,000 (*Izvestia*, May 20, 1954), with actual graduations probably about 90 percent of the anticipated figure.

[98] Appendix table II–C–1.

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1953–54 [99] suggest that various factors of selection were operative (especially in grades 8 and 9, when many students dropped out to take employment), the low promotion rates for those years point more to the process of academic selection than the retention rates, for they indicate that a certain percentage of pupils failed to pass the examinations required for promotion.

It may be argued that the low success rate in the 1930's (i.e., 49 graduations per 1,000 acceptances) was indicative of the inefficiency of the school system in adjusting its instructional methods to the education of the many average students and in devising more flexible policies designed to get more students through school. For nearly two decades Soviet secondary schools, especially the upper grades (8–10), hardly concerned themselves with the task of developing mass-oriented educational standards. The policy of expanding upper-grade enrollment was initiated in 1952. It may be argued that this has necessarily resulted in a lowering of academic standards since otherwise the system could not accommodate massive numbers of students. This does indeed appear to be borne out by Soviet educational developments since 1952.

The question is: what will the trend be in the future? The Soviet authorities predict that by 1965 the total annual number of graduates from the senior secondary level of the new 11-year regular schools and from part-time alternating-shift schools and schools for working and rural youth will be 128 percent of the number in 1958, [1] or an aggregate figure of about 2,000,000 graduates in 1965.[2] This figure is all-inclusive, and we do not know how many will graduate from the 11-year polytechnical schools with production training alone, though the figure will probably be less than 1 million. It is not probable that the promotion and retention rates will increase significantly in the early 1960's as compared with the 1950's.

When Soviet figures are compared with corresponding figures in other countries, it is apparent that a much larger proportion of students complete primary and secondary school in the United States. However, in most European countries and particularly in England, where the processes of selection are even more stringent than in the U.S.S.R., the success rates are correspondingly lower. In the United States, about 55 percent of the contingent of students entering school in any given year completes the 12th grade (i.e., senior high school). In the Soviet Union, only about 5 percent formerly, and recently about 25 percent, of 1st grade entrants graduated from 10-year school. The Soviet rate remained substantially less than 10 percent until 1954.

Although the stringency of the selection process is not necessarily a measure of the quality of education, it indicates that academic standards are enforced at least to some extent. Besides this, the Soviet state extensively applies direct methods of selection by channeling the less qualified or less diligent students into various alternative outlets. Personal circumstances are also a factor making for differences in individual educational opportunity, and in the past, tuition fees, the labor reserve draft, and the military draft discriminated as much by class as by academic fitness.

The Soviet school succeeds in weeding out those who have shown themselves to be the least fit, and tends to eliminate them at the first sign of academic weakness. It makes little provision for late bloomers and slow learners. Soviet educational policy is designed not so much to find and develop talent as to make use of whatever talent makes itself obvious. The school does not obligate itself to discover talent, but puts the burden of proof on the student himself.

The Teaching Staff in Soviet Primary and Secondary Schools and Student-Teacher Ratios

Appendix tables II-D-1 through II-D-5 present data on the number and distribution of teachers by level of grade, subject taught, education, and sex. The first thing to be said in discussing figures on teaching personnel in primary and secondary education is that the Soviet reporting category called "teachers" also in-

[99] *KS–1956*, pp. 172–173.
[1] *Pravda*, Dec. 24, 1958.
[2] Appendix table II–C–1. Estimate derived by applying the stated percentage to the 1958 base.

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TABLE II–36.—*Aggregate teaching staffs in Soviet primary and secondary schools, 1940, 1955, and 1959*

	1940	1955	1959
Grand total full- and part-time teachers with or without administrative functions in all regular primary and secondary schools; all teachers in schools for physically handicapped and retarded children; all teachers in schools for working and rural youth and adult general education schools	1,238,000	1,733,000	1,952,000
Total full- and part-time teachers with or without administrative functions in all regular schools (excluding schools for working and rural youth and teachers in schools for physically handicapped and retarded children)	1,216,000	1,655,164	1,813,000
Full-time teachers in all regular school grades; special subject (music, art, etc.) teachers; full-time teachers with administrative functions (directors of schools and supervisors of teaching); excluding teachers in schools for retarded and physically handicapped children and "other special schools" (unspecified), and excluding teachers in schools for working and rural youth	.....	1,624,558	1,807,000
Full-time teachers without administrative functions in all regular school grades and subjects, including special subject teachers	.....	1,371,926	1,541,000

Sources: *KS–1956*, pp. 132, 179; *NarKhoz–1960*, pp. 727,729, 733. See also appendix tables II–D–1 and II–D–2.

cludes, in addition to teachers themselves, supervisory and administrative personnel, such as school directors, deputy directors, heads of elementary schools, their deputies, etc. The aggregate figures also include part-time teachers. The inclusion of supervisory and administrative personnel in the category of "teachers" is justified by the Soviet authorities on the ground that they have some teaching duties as well, or are concerned with the scheduling and implementation of the instruction process and thus perform, though indirectly, teaching functions. The composition of Soviet teaching staffs may be clarified by the data in table II-36.

For 1959, for example, it may be seen that the total number of classroom teachers (1,541,000) differed from the aggregate number of teachers (1,952,000) by 27 percent. The difference of 411,000 was composed of 140,000 persons in schools for working and rural youth and special schools for handicapped children, 6,000 part-time teachers, and 265,000 personnel with administrative functions in the school. The data do not indicate what proportion of the latter were also engaged in classroom instruction.

If we examine the composition of teaching staffs in Soviet primary and secondary schools,[3] we observe that the majority of classroom teachers are women. In 1958 the proportion of women teachers was highest in the elementary grades (87 percent). In the intermediate grades 75 percent of the classroom teachers were women and in the upper grades, 68 percent. The proportion of teachers with completed higher education (4- or 5-year pedagogical institutes or 2-year teachers institutes) was less than 3 percent in the elementary grades, 34 percent in the intermediate grades, but 85 percent in the upper grades. In 1955 and again in 1958, about one-fifth of the teachers had been employed for less than 5 years.

The distribution of teachers by subject matter and education[4] indicates that in 1958 about 30 to 40 percent of specialized teachers in grades 5–7 had higher education, although the range was wide indeed, from less than 17 percent for teachers of physics and mathematics to 86 percent for French teachers. The vast majority of specialized teachers in grades 8–10 (some 80 to 90 percent) had higher education.

By subject matter, 37 percent of all teachers in grades 5–10 in 1958 taught sciences and mathematics; 40 percent, languages and literature; and the remaining 23 percent, history, geography, and the natural sciences.

One of the important indicators in any school system is the student-teacher ratio. Table II-37 summarizes these ratios in Soviet primary and secondary schools for various years by level of grades, both in relation to the number of classroom teachers and to the total number of teaching staff. The data indicate that there has been some improvement in the student-teacher ratio over the last 20 years, from 35:1 classroom teacher in 1938 to 30:1 in 1959. In 1955, the

[3] Appendix tables II–D–2 through II–D–5.

[4] Appendix tables II–D–4 and II–D–5.

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TABLE II–37.—*Enrollment, teachers, and student-teacher ratios in Soviet primary and secondary schools, 1938, 1950, 1955, and 1959*

Grades	1938			1950			1955			1959		
	Enrollment[a]	Classroom teachers	Student-teacher ratio	Enrollment[a]	Classroom teachers	Student-teacher ratio	Enrollment[a]	Classroom teachers	Student-teacher ratio	Enrollment[a]	Classroom teachers	Student-teacher ratio
	Thousands	*Thousands*		*Thousands*	*Thousands*		*Thousands*	*Thousands*		*Thousands*	*Thousands*	
1 to 4.....T..	21,200	605	35.1	19,670.8	558.7	35.2	13,579.5	446.7	30.3	18,517	614	30.2
U..	.....	.....	.....	.....	.....	.....	5,673.6	163.1	34.8	.....	.....	.....
R..	.....	.....	.....	.....	.....	.....	7,905.9	283.6	27.9	.....	.....	.....
5 to 7.....T..	8,800	320	27.5	12,031.2	457.6	26.3	9,268.2	556.8	16.6	10,438	537	19.5
U..	.....	.....	.....	.....	.....	.....	3,472.3	171.5	20.2	.....	.....	.....
R..	.....	.....	.....	.....	.....	.....	5,795.9	385.3	15.0	.....	.....	.....
8 to 10.....T..	1,400	68	20.6	1,496.0	80.4	18.6	5,253.1	267.1	19.7	4,285	221	19.5
U..	.....	.....	.....	.....	.....	.....	2,886.0	145.9	19.8	.....	.....	.....
R..	.....	.....	.....	.....	.....	.....	2,367.1	121.2	19.5	.....	.....	.....
Total.....T..	31,400	993	31.6	33,198.0	1,096.7	30.3	28,100.8	1270.6	22.1	33,240	1,372	19.5
U..	.....	.....	.....	.....	.....	.....	12,031.9	480.6	25.0	.....	.....	.....
R..	.....	.....	.....	.....	.....	.....	16,068.9	790.0	20.3	.....	.....	.....
Grand total[b].....	.....	.....	.....	33,198.0	1,425.3	23.3	28,100.8	1,624.6	17.3	33,240	1,807	18.4

T—Total. U—Urban. R—Rural.

[a] Excludes enrollment in schools for physically handicapped and retarded children. Teachers in these schools are also excluded.

[b] Total teaching staff, with or without administrative functions.

Sources: *Kul't Stroi–1940*, pp. 37, 68, 246; *KS–1956*, pp. 122–23, 178–79; *NarKhoz–1960*, p. 735; appendix tables II–A–3, II–D–2, and II–D–3.

only year for which such a breakdown is available, the ratio was higher in urban schools than in rural schools, particularly in the elementary grades.

The ratios above have referred to the number of students per classroom teacher. If we consider the aggregate teaching staff, as defined above (table II–37, last row), the ratios for various years are more favorable, as follows: [5]

1914	34:1	1950	23:1
1930	37:1	1956	17:1
1940	29:1	1959	18:1
1945	26:1		

With the rapid expansion of schooling in the early 1930's, the student-teacher ratio deteriorated to 37:1, but continued to improve thereafter. World War II had little effect upon the ratio because the majority of teachers were women. The further improvement in the 1950's was due partly to the general drop in school enrollment and partly to additions of new teachers. In comparison with the United States, the aggregate student-teacher ratios in the Soviet Union, particularly in recent years, have been favorable indeed.[6]

If the figures are adjusted to include "classroom teachers" only, and thus correspond to the U.S. category of "teachers," the ratios become higher, as follows, for 1959: Elementary grades 1–4—30:1; intermediate grades 5–7—19:1; upper grades 8–10—19:1. Comparable U.S. ratios for 1957 are: Grades 1–8—32:1; grades 9–12—20:1. In both countries the ratio improved decidedly beyond the elementary grades.

Disposition of Secondary School Graduates

Table II–38 summarizes data on the number of graduates from the 10th grade of Soviet regular schools. Since 1934, when the 10-year school system was established, graduations have increased by leaps and bounds. In 1933 there was a negligible number of graduates from the 9th grade (at that time the last grade of the secondary school). In 1934 there was still a negligible number as a result of the continuing transfers of students to other training outlets. Thereafter, except for the setback caused by World War II, the number of graduates increased rapidly, from 18,000 in 1935 to 1,340,-

[5] Derived from the data in appendix tables II–A–2 and II–D–1.

[6] The student-teacher ratio in the United States in public primary and secondary schools was highest in 1900, when it stood at 37:1, the same ratio the Soviet Union had in 1930. The U. S. ratio declined until the 1950's: 1920—32:1; 1940—29:1; 1950—27:1; 1952—27:1 (U. S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States, 1955*, p. 116). It has gone up steadily since 1952 and was 31:1 in 1957 (Educational Policies Commission, *The Contemporary Challenge to American Education*, National Education Association of the United States, 1958, p. 29.)

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TABLE II–38.—*Number of graduates from the 10th grade of Soviet regular schools, 1934–60*

[In thousands]

Year	Number	Year	Number
1934.....	negligible	1951.....	260.0
1935.....	18.0	1952.....	315.0
1936.....	42.0	1953.....	440.0
1937.....	112.0	1954.....	818.0
1938.....	155.0	1955.....	1,006.0
1939.....	232.0	1956.....	1,190.0
1940.....	285.0	1957.....	1,270.0
1941.....	422.0	1958.....	1,340.0
1946.....	127.0	1959.....	1,100.0
1947.....	164.0	1960.....	700.0
1950.....	220.0		

Source: Appendix table II–C–1. Note that the figures exclude graduates of part-time schools for working and rural youth who numbered 500,000 in 1960.

000 in 1958. The decline in both 1959 and 1960 is the result of demographic trends.

Related to the supply of secondary-school graduates is the question of their utilization. The small number of graduates in the mid-1930's was a distinct handicap to the expansion of higher education. Only in the last prewar years did the number of secondary-school graduates exceed the number of available places in higher education.[7] By 1940 there were twice as many graduates as vacancies in higher education; in that year, however, the surplus was absorbed by the military draft. In the immediate postwar years there was again a shortage of 10-year-school graduates to satisfy the requirements for first-year entrants into higher education. Beginning in 1950, however, the annual supply of secondary-school graduates began to exceed the number of vacancies in higher education. This situation was first viewed by the Soviet authorities as advantageous for selecting the best qualified candidates.

By the mid-1950's, however, the question arose what to do with the surplus of secondary-school graduates who could not be accepted by the higher educational establishments. As early as 1954, the Soviet press complained that the Young Communist League and the school authorities "wrongly orient" the students in the 10th grade, that the students were being directed to continue their education, whereas they should have been told to become skilled workers.[8] Starting in that year, the disposition of secondary-school graduates began to take a new direction. Large numbers entered semiprofessional schools, and the State Labor Reserve set up vocational-technical schools with 1 to 2 years of training. Between 1953 and 1956, however, there were still 2.2 million secondary-school graduates who did not continue their education either at the higher level or in semiprofessional schools.[9] These graduates had to seek employment, but their exclusively academic preparation was a major handicap and many managers refused to hire them on various grounds.[10] Special placement bureaus (*komitety trudoustroistva*) were set up to help these graduates and issued orders (*putevki*) to specific enterprises to hire them.

Meanwhile, to meet the objections of management that secondary school graduates did not have sufficient skill preparation, the piecemeal adjustment of the school programs began. In 1953 virtually no 10-year schools offered any skill training, but by 1959 about one-half of their graduates were said to have had some such training.[11] Soviet authorities called this "a very modest beginning" and said that beginning in the fall of 1959 "tens of thousands" of pupils should be trained for vocational and trade skills.[12] A genuine training program to develop specific vocational skills was put into effect in 1959–60. In 1960 about 172,000 10-year school graduates (25 percent of the total, 700,000) received vocational trade certificates along with their graduation diplomas.[13] Under the educational reform, this number is expected to increase considerably in the early 1960's, and the majority of graduates will have received such training.

[7] See discussion in ch. IV.

[8] *Izvestia*, May 19, 1954.

[9] *Pravda*, Apr. 20, 1958.

[10] I.e., they were "too young," did not have the needed skills, or the job was not suitable for them. See *Pravda Ukrainy*, July 23, 1957; *Kommunist Tadzhikistana*, June 1, 1957; *Sovetskaia Latvia*, Mar. 6, Sept. 16, 1958; *Molodoi kommunist*, No. 1, 1958, p. 101; *Sovetskaia Kirgiziia*, June 27, 1958.

[11] In 1959 the Russian SFSR graduated 300,000 students with "vocational skill training" and the Ukrainian SSR, 140,000 (*Komsomol'skaia pravda*, Aug. 20, 1959; *Pravda*, Aug. 14, 1959). These 440,000 graduates represented less than 50 percent of the 1,100,000 10-year school graduates that year.

[12] *Pravda*, Aug. 14, 1959.

[13] *Pravda*, Jan. 26, 1961.

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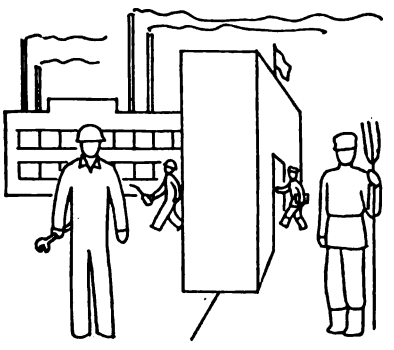

CHAPTER III

Secondary Specialized, Vocational and Semiprofessional Education

During the last three decades nonagricultural employment in the Soviet Union has multiplied fivefold. It increased from about 10 million workers and employees in 1928 to over 50 million in 1958.[1] On the average, disregarding various slowdowns and accelerations, it thus expanded by about 1.3 million per year. In addition to having to provide this net annual increment in total nonagricultural employment, losses and withdrawals due to a variety of causes had to be covered, which required on the average an additional 2 million persons annually. These additions were drawn from the rural population, from the natural growth of the urban population, and from higher rates of employment participation, of females in particular.

Every industrial economy has diversified requirements for various semiskilled, skilled, technical, and specialized supporting occupations. In the Soviet Union today the roster of occupational classification titles for semiskilled, skilled, vocational-technical, and semiprofessional levels combined numbers approximately 10,000 for the national economy at large.[2] In order to satisfy the demands of the growing economy in employing labor in such great numbers and with so much diversity of skills, the Soviet Union has established an extensive and probably unique system of formal educational facilities for the training of skilled labor and supporting personnel, in addition to the various types of informal on-the-job apprenticeship programs.

That the U.S.S.R. decided to place such heavy emphasis upon formal education in vocational-technical skills and semiprofessional occupations may be the outcome of historical circumstances. The traditional apprenticeship system on which Europe and pre-Revolutionary Russia depended was too slow and socially unacceptable to the demands of Soviet planning and socioeconomic aims. From the very onset of industrialization, the enormous quantitative as well as qualitative requirements for skilled labor had to be satisfied from a population which did not have the required qualitative complement of such skills—skills which in the West have developed over several generations during the process of gradual industrial growth. In the Soviet Union a skilled labor force was required almost instantly and in such numbers that it had to be trained on a continuing basis. The establishment of a formal system of schools exclusively devoted to this task was perhaps the only rational solution for the exigencies of the times.

The special emphasis on formal vocational and skill training in the system of vocational-technical and semiprofessional schools in the U.S.S.R. is related to the recruitment of young labor into the labor force. This distinction must be made, for as far as aggregate additions

[1] *NarKhoz—1959*, p 658. See also the discussion in chs. I and VI.

[2] G. I. Zelenko and F. L. Blinchevskii, *Sovetskoe professional'no-tekhnicheskoe obrazovanie na novom etape* (Soviet Vocational-Technical Education in the New Phase), Znanie Series II, No. 32, Moscow, 1959, p. 29.

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to skilled and semiskilled labor are concerned, the principal method of training has been training directly on the job. But it was the system of special schools, more extensive than in any other economy, which permitted the early channeling of Soviet youth into skilled and semiskilled occupations.

There are two components in the Soviet educational system which must be clearly distinguished. First, the general education schools, which until the mid-1950's, were primarily concerned with the preparation of students for higher education, offered an academic curriculum. The second component consisted of a system of schools specifically aimed at training semiskilled and skilled manpower and, on the secondary level, semiprofessionals. This dual division of functions reflects the philosophy of Soviet education which prevailed for a period of almost three decades and which stipulated that specialized education could be offered more efficiently in a *separate* system of school facilities.

In chapter II we discussed primarily the general education (10-year) schools and the revision of programs currently in effect. It was also pointed out in chapters I and II that in time of emergency, general education schooling was at times sacrificed to vocational-technical objectives. In the late 1920's and early 1930's, when the demand for skilled manpower was particularly pressing, general education schools were made into adjuncts of the factory.

In the early 1930's, most students in the upper grades (8–9) of general education schools were simply transferred to the expanded system of semiprofessional schools, and literally millions of youths in the intermediate grades (5–7) were sent to factory schools, known by a variety of abbreviations—*FZO, FZU (fabzauch), PPK, RTS, PTK,* etc. This was accompanied by accelerated recruitment of the adult rural population and of women for industrial jobs, some of the recruits being first sent to the factory schools and others trained directly on the job. As the emergency passed, the formal skill training institutions proved to be convenient in the case of young labor primarily, and the system of vocational-technical, trade, and semiprofessional schools continued to exist as a separate component of the Soviet educational system.[3]

Developments in recent years associated with the educational reform are twofold. On the one hand, vocational-technical and other skill subjects are being introduced in general education schools. Perhaps because of unfavorable demographic trends this is in a sense a repetition of an emergency situation. On the other hand, education in the separate system of vocational schools and specialized secondary semiprofessional schools continues. It is the latter that this chapter will consider.

The Soviet System of Vocational-Technical Education

In training new skilled labor and improving the quality of the labor force, the Soviet Union depends on an elaborate system of schools and courses which are operated separately from the system of general schools.[4] In the American setting there are comprehensive high schools which offer different options in the instruction program (college preparatory, general, commercial, vocational, etc.), though each of the options may have a core of common subjects. There are also special purpose high schools such as technical, agricultural, etc. In the U.S.S.R. such diversified high-school education within general secondary schools did not exist. As already pointed out in chapter II, even the present educational reform does not attempt to introduce any semblance of entirely differentiated orientation in the general secondary school program. Applied vocational skill preparation will be given in addition to standard curricular and still highly academic subjects, and different schools will offer different specialized vocational profiles. The need for further diversification in Soviet education will continue to be met chiefly through a *separate* net-

[3] For a general survey dealing with the prewar and early postwar years, see W. Galenson, *Industrial Training in the Soviet Union,* RM–1479, Santa Monica: The Rand Corp., May 5, 1955.

[4] A. N. Veselov, *Nizshee professional'no-tekhnicheskoe obrazovanie v RSFSR* (Lower Vocational-Technical Education in the Russian SFSR), Moscow, 1955. Among other topics, this book deals with the historical aspects of vocational trade education, particularly in the 1920's.

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work of schools—apprenticeship, vocational-technical, agricultural, and semiprofessional training establishments.

1. *The State Labor Reserve*

Beginning with the establishment of Soviet power after the Revolution, until 1929, vocational education in the U.S.S.R. was administered as an adjunct of the regular school program by the people's commissariats of education (*narkomprosy*). Through a special departmental agency—*Profobr* (Vocational Education)—they managed the separate vocational schools as well as vocational training programs within the regular education system.

As the industrialization drive advanced, all vocational schooling was put under the direction of individual plants and enterprises and the respective economic administrations. During the 1930's the general recruitment of labor, adult as well as juvenile, was handled by *Orgnabor* (Organized Recruitment of Labor), an all-union agency which was responsible for sending certain quotas of newly hired labor to industrial enterprises, to be trained there either as apprentices or in the enterprise vocational schools. It did not take very long, however, before this arrangement proved unsatisfactory.

In the latter part of the decade Soviet labor recruitment ran into such difficulties that in the years 1937–39 the quotas were by official admission underfulfilled by 3.8 million.[5] In order to remedy this situation, the Soviet Government created in the fall of 1940 (decree of October 2) a new central agency, the State Labor Reserve Administration.[6] Within the text of the decree the Government summed up its purpose by stating that "the task of the further development of socialist industry requires a continuing flow of new labor into mines, transportation, factories and enterprises. . . . The state must undertake the task of organizing the training of new workers from among urban and rural youth by establishing labor reserves for industry." [7]

The State Labor Reserve Administration thus became the chief all-union agency responsible for managing vocational schools in most matters of financing, development of curricula, staffing, and determination of enrollment quotas. It was directly subordinate to the Council of People's Commissars (precursor to the Council of Ministers), and the various schools transferred to its jurisdiction were operated under its exclusive authority, so that neither their programs, nor their enrollment quotas could be altered by the enterprises or economic administrations which had earlier operated them.

The agency was also given the power to draft youths into Labor Reserve schools, and it could, on a nationwide basis, assign youths aged 14 to 17 to any training program it desired. In the fall of 1940 about 600,000 youths were thus drafted to enter factory, trade, and railroad schools, or various types of the 1,549 Labor Reserve schools. Every year thereafter, several hundred thousand youths aged 14 to 17 were drafted (or forced to "volunteer") for training in the State Labor Reserve schools, which usually lasted from 6 months to 2 years.[8] In the 18-year period between 1940 and 1958 an average of 570,000 persons annually were subjected to such recruitment. It was rumored in the early 1950's that as there were enough "volunteers," the draft would no longer have to be applied, although there is no official decree abolishing it.

The highest level of enrollment in schools of the State Labor Reserve was reached in 1957, when almost 1.4 million were enrolled.[9] In 1958 there was a severe drop in enrollment (from 1,394,000 in 1957 to 904,000 in 1958) due to a general deficit of youths in the appropriate age group and consequent recruitment difficulties. In 1959 the enrollment increased somewhat, to 996,000, due to the intensified channeling of youth into State Labor Reserve schools as one of the school reform measures, but it was still 300,000 less than in

[5] F. L. Blinchevskii and G. I. Zelenko, *Professional'no-tekhnicheskoe obrazovanie rabochikh v SSSR* (Vocational-Technical Education of Workers in the U.S.S.R.), Moscow, 1957, p. 64. This is a short but comprehensive study of this segment of the Soviet educational system.

[6] For an interesting discussion, see P. R. Lever, *The State Labor Reserve System of the Soviet Union*, unpublished Ph.D. dissertation, Columbia University, 1948.

[7] Blinchevskii and Zelenko, *op. cit.*, p. 66.

[8] The draft usually took place in the fall, but in 1946 and 1947, when the largest enrollment (close to 1 million) was registered, there were several draft calls during the year (*Trud*, Feb. 12, Aug. 15, 1947; *Proizvodstvennoe obuchenie*, No. 2, 1947, p. 4).

[9] Appendix table II–A–1.

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TABLE III–1.—*Number of skilled and semiskilled workers trained in schools of the State Labor Reserve and through individual apprenticeship training programs, 1940–59*

[In thousands]

Type of school	1940	1941–45	1946–50	1951–55	1956	1957	1958	1959
Schools of the Main Administration of the State Labor Reserve, total	.....	2,475	3,392	2,364	665	696	653	583
Among which—								
Vocational-technical	none	none	none	27	90	81	98	93
Trade, railroad and mining schools	.....	685	1,024	719	118	93	109	106
Mechanization of agriculture and trade agricultural schools	none	none	none	628	255	318	268	248
Schools of *FZO* type and construction and mining schools	.....	1,790	2,368	990	202	204	178	136
Schools of the Main Administration of State Labor Reserve training mass cadres of agricultural specialists and courses of the Ministry of Agriculture of the U.S.S.R., total	.....	.....	.....	3,251	510	529	422	478
Among which—								
Tractor drivers	.....	.....	.....	1,764	278	352	306	397
Combine operators and mechanics	.....	.....	.....	380	23	69	59	[a]13
Combine operator helpers	.....	.....	.....	154	31	22	11	12
New employees trained by enterprises	1,950	*2,672	*2,674	*2,790	2,702	2,618	2,761	2,860
Among which, workers	1,606	*2,261	*2,261	*2,480	2,481	2,457	2,605	2,703
Retraining of employees by enterprises	1,655	*2,556	*4,459	*4,907	5,319	5,203	5,596	5,966
Among which, workers	1,472	*1,851	*3,228	*3,446	3,952	4,074	4,439	4,644

*Average per annum.
[a] Decline due to reorganization—lengthening of study.
Source: *NarKhoz—1959*, pp. 692–694; *NarKhoz—1960*, pp. 622, 624.

the mid-1950's.[9a] When the reform is fully implemented in the early 1960's, enrollment in the new rural and urban vocational-technical schools should expand substantially over the level of the mid-1950's.

Table III–1 summarizes data on the number of graduates trained in State Labor Reserve schools between 1940 and 1959. The table also presents figures on the number of workers trained through other programs, both formal and informal, during the same period. It is evident from these data that during the 1940-58 period about 4 million persons were trained annually for some type of "new job" (exclusive of retraining).[10] If training for industrial jobs only is considered, the State Labor Reserve schools turned out 10,225,000 workers during the 18-year period 1940–58, and this accounted for approximately one-fifth of total new labor trained through this and other (i.e., on-the-job, apprenticeship) types of programs.

In the early 1950's the operations of the State Labor Reserve schools were extended to include agriculture (a few such schools had been set up during the war, but their general establishment was not decreed until 1953). In addition to the industrial and agricultural State Labor Reserve schools, which offered training on an intermediate level (i.e., for students recruited from grades 5–7 or who completed the 7th grade), State Labor Reserve institutions were established in the 1950's to train regular 10-year-school graduates. In 1954 about 250 technical-vocational schools were set up to absorb the surplus graduates from the 10-year schools for training in skilled labor occupations; their number has expanded since.

It has been noted that the State Labor Reserve draft absorbed the dullest boys,[11] but Soviet authorities have not made this explicit. According to official sources, the draft was a selective one and affected first those pupils who were unsuccessful academically in regular secondary school.[12] Thus, although there may have been

[9a] In 1960 enrollment increased to 1,050,000 (*SSSR—Tsif—1960*, p. 306).

[10] Note that except for State Labor Reserve trainees, "new jobs" is a gross concept. A person who is already employed but goes to another place of employment and takes training is classified as a "new employee." This does not take into account retraining while on the job.

[11] Ashby, *Scientist in Russia*, p. 64.

[12] *Izvestia*, Sept. 1, 1945 (Moskatov article). P. G. Moskatov was then head of the Main Administration of the State Labor Reserve. The present head is G. I. Zelenko, who also headed this administration from its inception in 1940 until about 1948.

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some students among the draftees who were sufficiently qualified to continue in regular schools, it appears that the majority of those who were channeled through this compulsive device into skilled labor occupations did not have sufficient qualifications to continue their education in the regular secondary school.

As to the discriminatory nature of the State Labor Reserve draft, it should be pointed out that it was aimed primarily at rural youths, many of whom quit school after a few years of elementary education. In 1947, during one of the draft calls for example, out of some 300,000 draftees, about 254,000, or almost 84 percent, were recruited from rural areas.[13] Summary data on the rural/urban origin and male/female composition of labor reserve students are presented in table III–2.

TABLE III–2.—*Total number and composition of students entering State Labor Reserve schools, by urban-rural and male-female breakdown, 1940–59*

[In thousands]

	Totals for period			Annually			
	1940–45	1946–50	1951–55	1956	1957	1958	1959
Total acceptances	3,703	3,568	2,384	706	709	691	682
Urban	1,315	814	801	311	316	272	258
Rural	2,388	2,754	1,583	395	393	419	424
Percent rural	64.5	77.2	66.4	56.0	55.4	60.6	60.2
Males	2,761	3,218	2,114	608	608	597	583
Females	942	350	270	98	101	94	99
Percent female	24.5	9.8	11.3	13.9	14.2	13.6	14.7

Source: *NarKhoz–1959*, p. 694; *NarKhoz–1960*, p. 623.

Thus, until about 1955, one of the purposes which the draft served was to transfer youth from rural occupations into the industrial labor force. In the mid-1950's this transfer function of the State Labor Reserve slowed up somewhat (again simply because of the smaller number of pupils in the appropriate age group), but by 1958 and 1959 the proportion of students from rural areas in State Labor Reserve schools had again increased. The training offered in State Labor Reserve schools, limited as it may have been in comparison to that offered in the regular secondary school program, still represented an addition to education which may not otherwise have been attained by an individual in rural areas.

The data in table III–2 also indicate the extremely small proportion of females among students entering State Labor Reserve schools. Women accounted for only 10 to 14 percent of acceptances (except during the war years, when their proportion increased to 25 percent). This is a reflection of the general Soviet policy of not recruiting women into complex skilled occupations in the industrial labor force. More recent data (for 1954 and 1955) substantiate this. Among some 100 occupational titles examined, the proportion of women was invariably low in high-skill occupations and high in low-skill occupations. Outstanding examples of the two extremes of female participation in the occupational spectrum in 1956 follow: [14]

	Percentage of women
Low-skill occupations:	
Weavers	99
Candymakers	89
Oilers and sweepers	98
Peat briquette makers	97
High-skill occupations:	
Milling machine operators	17
Electricians	11
Automatic machine-tool adjustors	10
Metalworkers	5

2. *Structure and Types of Vocational Education*

Soviet vocational schools have performed an indispensable function; they have provided for a diversity of education which could not be found in regular secondary schooling. Although the prior education of those entering these schools is only of the intermediate-grade level, and although these schools are essentially terminal, they do provide great variety to an otherwise standard Soviet school program. An examination of trade school curricula and study programs [15] reveals that from the mid-1950's until the last educational reform, 80 percent of instruction time was generally devoted to applied skill and trade subjects, and the remainder to a few general academic subjects, political indoctrination courses, and physical education. Most of these schools offered very little general education in academic subjects. However, there

[13] *Trud*, Feb. 12, 1947.

[14] *Vestnik statistiki*, No. 6, 1956, pp. 83–84; *Zhenshchina*, pp. 40–41.

[15] Blinchevskii and Zelenko, *op. cit.*, give some 20-odd curricula for various trades and discuss course contents.

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were some 4- and 7-year vocational schools (such as those training miners) where some academic work equivalent to that in the upper grades of general secondary schools was offered, but their number was very small.

As of January 1958, the network of these vocational schools was as follows.[16]

Trade schools (remeslennye uchilishcha).—1958 enrollment—223,000, in 708 schools. The length of training was 2 years and was based on 7 years of regular school. The majority of youths entered at the age of 14 to 16. The study program contained 3,130 to 3,220 instruction hours, the majority of which (1,920 to 2,030) was devoted to *applied* trade training. Technological subjects according to specialty accounted for another 380 to 450 instruction hours. The remainder of the instruction time, about 20 percent, was devoted to theoretical technical subjects (170 hours), general academic subjects (mathematics, language), political indoctrination (300 to 360 hours for both categories), and physical education (140 hours). The school year lasted about 43 weeks, with 36 to 42 instruction hours per week. Applied instruction was stepped up gradually (from 18 hours per week in early training to 36 hours per week towards the end of the program). There were two examination sessions, one week each.

Railroad and transportation schools.—While these schools were not subordinated directly to the State Labor Reserve Administration, their training program was similar to that for the trade schools discussed above. Training lasted usually 2 years, but some had more extensive training. About 70 different categories of operating personnel were trained in these schools.

Construction, mining, and factory (FZO) schools.—1958 enrollment—212,000, in 1,019 schools. The program was designed for those who completed 7 years of education and were aged 16 to 18. The most common program lasted 10 months, with 1,550 instruction hours, of which 1,150 were devoted to applied trade and 230 to technological subjects. The remaining time went to physical education and political indoctrination (86 hours each). Applied training was given in school shops or right on the job in producton enterprises. Construction schools (43,000 students) were converted in 1959–60 to 2-year trade schools.

Vocational-technical schools.—1958 enrollment—138,000, in 432 schools. Three types were in existence, with 1, 1½, or 2 years of training. The entering age was *over* 17 for those who had completed the regular 10-year school. The program for the 1-year school was based on 1,810 instruction hours, of which 1,050 to 1,250, depending upon specialty, were devoted to technical trade skills and up to 490 hours to technological subjects. The remainder of time was spent on political indoctrination courses and physical education. Technical trade skill training took up 24 hours in the early weeks and 41 hours in the last weeks of training. The total number of training weeks was 43.

The 1½-year program was based on 2,780 instruction hours, with up to 2,000 hours devoted to technical trade subjects. The 2-year program entailed 3,450 instruction hours, with up to 2,360 hours given to technical trade subjects. There were 41 instruction hours per week in all programs, with stepped-up trade training towards the end of the course. The schools trained skilled workers (and some technicians as well) in categories 4 to 6 of the Soviet 9-step skill qualification rating system.[17]

Trade schools for the mechanization of agriculture.—1958 enrollment—202,000, in 881 schools. The program was designed for those who had 7 years of general schooling, but the minimum entering age was 17. It was based on 2,200 instruction hours, with applied training taking up 770 hours and class study of technical subjects, 1,258 hours. The remainder of the time was devoted to the fundamentals of agriculture, political indoctrination and physical education. The schools trained tractor drivers, agricultural machinery operators and repair mechanics.

Special mining schools.—1958 enrollment—1,500, in 5 schools, exclusively reserved for the sons of miners. Training lasted 10 years, com-

[16] This material is based on Blinchevskii and Zelenko, *op. cit., passim;* and the survey article by P. Rudnev, "K voprosu ob uluchshenii sistemy shkol'nogo obrazovaniia" (On the Question of Improving the System of School Education), *Narodnoe obrazovanie,* No. 7, 1958, pp. 13–29.

[17] The most common system in the three decades prior to 1959-60 was a 9-grade classification of skilled worker occupations, though there were grading systems ranging from 8 up to 15. Presently a consolidated grading system consisting of 8 grades is being introduced.

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bining the regular 10-year school with an applied mining trade specialty.

Special purpose vocational-technical schools. —1958 enrollment—4,500, in 29 schools. These were reserved exclusively for pupils of orphanages. Education lasted 12 years and was a combination of the 10-year school plus the vocational-technical type of school discussed above.

In all of these schools (3,146), with a total enrollment of 781,000 in 1958, training was offered in about 800 skilled trade and vocational-technical specialties. Until 1959 students in these schools received full board and uniforms, plus a monthly maintenance allowance. As a result of the school reform, it appears that most students will now receive instead an apprenticeship wage for actual work done.

3. *The Educational Reform and Vocational Education*

Long before Khrushchev's educational reform was introduced, a debate had been in progress in Soviet education and reported in the Soviet press as to whether or not the State Labor Reserve schools should be integrated with the production enterprises for which they train skilled labor. Many deficiencies of these schools were pointed out, and their separation from "production" (this despite all the applied emphasis!) was often mentioned. The splintering of training of skilled workers in various State Labor Reserve schools, factory schools, etc., led to demands to consolidate vocational training under a single authority.[18] The head of the Main Administration of the State Labor Reserve, G. I. Zelenko, published an article[19] in which he said that the demands of the 7-Year-Plan called for the expansion and consolidation of trade schools as new institutions—urban and rural vocational-technical schools which would supplant secondary schools and would accept most youths aged 15 to 16 for specific employment training.

Zelenko's proposals became one of the fundamental features of the reform as it was finally adopted. In the summer of 1959 the Main Administration of the State Labor Reserve was reorganized into the State Committee on Vocational-Technical Education of the Council of Ministers of the U.S.S.R.[20] This committee is now in charge not only of the reorganized urban and rural vocational schools, which will offer 6-month to 3-year training courses to graduates of the new 8-year school, but also of the vocational training in 11-year and alternating-shift secondary (grades 9–11 only) schools. This new committee will also determine the profiles of "production specialization" in the upper grades of the new 11-year school. To suit local conditions, however, production specialization in secondary schools will be determined by special boards of the regional economic councils and local representatives of the ministries of education, with concurrent approval of the new State Committee on Vocational-Technical Education.

On-the-job training, called brigade or individual apprenticeship, has been retained; but it is supposed to concern itself primarily with semiskilled or low-grade skilled occupations (i.e., jobs of a skill proficiency rating 4 or lower in the occupational grade scale).

In the course of 1957–59 the State Committee on Labor and Wages[21] and the Main Administration of the State Labor Reserve "processed" about 10,000 occupational designations and singled out 4,500 to be included in the roster of those for which special on-the-job preparation or formal vocational trade training was viewed as essential.[22] A roster of 2,769 occupations was designated as requiring on-the-job training, which as in the past will be conducted first by hiring a person as an apprentice and giving him a course plus individual or team applied instruction.[23] Another 1,841 occupations are to require training in vocational-technical schools, and preparation for 1,834 occupational specialties was delegated to the newly estab-

[18] *Sovetskaia Kirgiziia*, Jan. 7, 1959.

[19] *Professional'no-tekhnicheskoe obrazovanie*, No. 8, 1958. pp. 1–6. This article was a precursor to his statement that general secondary education had outlived its usefulness and should be abolished as an institution. See ch. I, section on school reform.

[20] *Sovetskaia Rossiia*, July 28, 1958. Details on organization and functions may be found in *Professional'no-tekhnicheskoe obrazovanie*, No. 8, 1959, p. 6.

[21] *Partiinaia zhizn'*, No. 22, Nov. 1959, p. 60. One of the chief innovations in the new occupational classification is the elimination of "parallel" titles and the creation of "consolidated" (*skvoznye*) occupational specialties. As a result, the same occupational designation now applies to similar jobs in diverse industry sectors.

[22] *Professional'no-tekhnicheskoe obrazovanie*, No 8, 1959, p. 7.

[23] Zelenko and Blinchevskii, *op. cit.*, p. 33.

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lished programs of the secondary (general, grades 8–11) schools with production training.

In vocational-technical schools three "levels" of specialization were introduced: (1) 6-month to 1-year training with approximately 1,600 instruction hours in the 1-year program, of which 1,400 are to be applied; the training is designed for "single profile" trades, such as machine tool repairmen, automatic lathe operators, bulldozer drivers, etc. (2) 2-year training, with 3,000 instruction hours, which is to prepare workers for "universal profile" trades, such as nonautomatic machine tool operators, welders, machinists, electricians, chemical process operators, all building trades (carpenters, plumbers), etc. (3) 3-year training, with 5,000 instruction hours, for high-grade "single profile" precision specialties, such as adjusters of automatic machine tools and continuous line assembly mechanics, precision and electronic equipment assemblymen and testers, locomotive drivers, tool and die makers, blast-furnace operators, ship mechanics, etc. Training in the first and second level is to be offered not only in vocational-technical schools, but also in secondary schools with production specialization as well. Finally, as a complete innovation, the reorganized schools for working and rural youth will now become alternating-shift schools and will offer also vocational trade training.[24]

Even though the educational reform has introduced vocational and trade training into general education schools (see ch. II for discussion of the new curriculum), vocational-technical training as a separate undertaking remains. In terms of its comprehensiveness, it is being expanded. From the trade specialization point of view, it is undergoing qualitative improvement, for all the revised programs have stepped up the required number of instruction hours.[25] The vocational and trade specializations are being broadened somewhat, but there are no signs that broader basic education in academic subjects will be introduced. There is more diversity in the range of training skills. Reports in the Soviet press indicate that not only mechanics but seamstresses, tailors, and even barbers will be trained in the new vocational-technical schools.[26]

The Soviet planners are clearly concerned with improvement in the quality of laboring skills, as attested to by the educational reform. On his visit to the United States, the Soviet Minister of Construction, M. Kozulia, remarked to the author: "Our engineers and architects can design any building we want, but we don't have enough good masons, carpenters, or plasterers to build it." It is similarly reported that in the Soviet machine building industry, for example, the most advanced machine tool is adjusted by the whack of a steel hammer.[27] The dilemma of Soviet vocational education consists of the desire to provide an immediate flow of skilled labor and the obvious long-run necessity of establishing broader specialization profiles and the requirements of more general education for its more skilled workers in the future. How and if these two objectives can be reconciled remains to be seen.

Secondary Semiprofessional Education—General Setting

The vocational-technical schools described above are designated in Soviet sources either as "mass vocational" schools (*massovaia professional'naia shkola*) or "lower vocational" schools (*nizshaia professional'naia shkola*). In addition to these schools, Soviet authorities single out a second level of vocational-technical education—"secondary vocational schools" (*srednie professional'nye shkoly*)—which are commonly called technicums (*tekhnikumy*). They are also known as secondary specialized educational establishments (*srednie spetsial'nye uchebnye zavedeniia*), or, as they often will be referred to in this study for brevity's sake, semiprofessional schools. Like the vocational-technical schools, semiprofessional schools have been providing for the last three decades the necessary diversity in training which the standard-curriculum, one-track, academic secondary schools did not.

In recent years there have been in the U.S.S.R.

[24] *Professional'no-tekhnicheskoe obrazovanie*, No. 12, 1959, p. 27.

[25] Construction trade schools, for example, have increased the requirement from 1,146 instruction hours to 2,388 (*Stroitel'naia gazeta*, Aug. 7, 1959).

[26] *Sovetskaia Belorussia*, Nov. 27, 1959.

[27] Observation by Prof. S. Melman, of Columbia's School of Industrial Engineering, in a private seminar.

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about 3,760 semiprofessional schools, with an enrollment of about 1,800,000 students (for precise figures in all years, see discussion below) aged 14 to 30. Until 1950 semiprofessional schools were as a rule 4-year secondary schools, accepting persons with completed 7-year education who could pass the competitive entrance examinations. They were thus in effect the vocational-technical school counterpart of the upper grades (8-10) of the Soviet 10-year school. Starting in the early 1950's new programs began to be set up within the existing semiprofessional schools, and then entire schools changed over to 1½- to 2½-year programs offering training to graduates of the Soviet 10-year school.

It was reported that in the years 1955–57 up to 70 percent of all first-year entrants [28] were enrolled in these shorter programs. Curiously enough, this conversion of semiprofessional schools to a shorter program is by no means a recent idea. It was planned as early as 1938 that during the following 2 years some semiprofessional schools would be converted to a 2½-year program [29] for 10-year-school graduates. These plans did not materialize because of insufficient numbers of 10-year-school graduates in the late 1930's and the devastating effect upon secondary schooling of the Second World War which followed shortly thereafter. Only by the early and mid-1950's was there a relative abundance of 10-year-school graduates, and semiprofessional school programs were then adjusted, pretty much along the lines contemplated some 15 years earlier, in order to accommodate the 10-year-school graduates who could not then gain admission to higher education and yet did not have the specialized skills necessary to find suitable employment in technical jobs.

1. *Functions of the Soviet Semiprofessional*

Every industrial economy requires a large supply of specialized manpower, consisting of technicians and various specialists with secondary education only. It is extremely difficult to describe accurately this segment of trained manpower. In defining professionals on the basis of educational criteria, various reservations have already been noted, and more will follow in the next chapter. In regard to the definition of semiprofessionals, even more difficulties arise. Semiprofessional skills are often obtained through on-the-job training, and the occupational mobility of semiprofessionals is not so strongly restricted by formal education as in the case of professionals. For purposes of the present discussion, we shall use the term "semiprofessional" to identify a heterogenous group of Soviet specialists who have completed formal secondary specialized training. (Chapter VI will discuss in detail the relationships between professionals with higher education, semiprofessionals with secondary specialized education, and other "specialists by occupation" without formal training.)

But since educational criteria alone are not adequate, it may be useful within the context of this analysis to discuss some of the occupational functions which these Soviet specialists are asked to perform.

It is obvious that the U.S.S.R., West European, and American economies evolved different methods of industrialization. While in Western countries industrialization proceeded gradually, the U.S.S.R. is noted for its rapid strides toward the establishment of an industrial order. The differences in method of industrialization account to a significant degree for the differences in the pattern of technical preparation of semiprofessional manpower. In the United States certain "semiprofessional" occupations are held by persons who have college degrees; others are practiced by those who have acquired skills through on-the-job experience but who have no formal training; and still others, by specialists who have attended vocational or industrial high schools or private technical institutes, vocational or trade schools, junior or vocational colleges.[30] A large number of American technicians receive training either on the job or in the military establishment. Soviet technicums and other secondary specialized schools give *formal* training for persons in many of these occupations. While formal train-

[28] *Narodnoe obrazovanie*, No. 7, 1958, p. 15.
[29] *Plan Khoz*, No. 6, June 1938, pp. 167–169.

[30] The most thorough survey of semiprofessional technical training programs and the institutions which offer them in the United States may be found in: G. R. Henninger, *The Technical Institute in America*, Carnegie Series in American Education, New York: McGraw-Hill Book Co., Inc., 1959.

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ing is emphasized in the U.S.S.R., similar skills may be acquired through on-the-job experience there as well as in the United States. The difference is one of quantity, however; in the Soviet Union the majority of semiprofessional jobs are reserved for persons with formal specialized training. In the United States, on the other hand, formal training specifically oriented for semiprofessional jobs is not numerically significant.

An American machine-shop foreman may be a person who has acquired his skill on the job, while the same occupation in the Soviet Union is likely to be filled by a person who was graduated from an industrial technicum and who specialized, let us say, in the design, maintenance, and operation of machine tools. An electronics technician in the United States may be a graduate of a trade school or he may have taken some apprenticeship courses conducted by a large manufacturer, while his counterpart in the Soviet Union is likely to be a graduate of an electrical engineering technicum. Our nurses receive a certificate from an accredited hospital or possibly a college degree, while the Soviet nurse is almost exclusively a secondary semiprofessional medical school graduate. Our veterinarian is often the product of an agricultural college, while in the Soviet Union he is likely to be a veterinary technicum graduate. Soviet dentists are almost exclusively graduates of secondary specialized schools of dental medicine. Our railroad traffic dispatchers generally receive on-the-job training, while in the Soviet Union they are transportation technicum graduates. Our primary schoolteacher is probably a teacher's college (post-secondary) graduate, while the Soviet elementary schoolteacher is likely to be a pedagogical (normal-secondary level) school graduate. Our technical draftsman is probably an industrial high-school graduate; in the Soviet Union the same skill is often acquired in an engineering technicum.

These examples can be multiplied many times since Soviet secondary specialized schools used to train specialists in over 1,000 semiprofessional specialties for various branches of the economy. At the same time, such examples suggest how very difficult it is to find comparability of educational criteria between certain occupations in the United States and those in the Soviet Union. In many instances, occupational specialization in the United States is obtained by an automatic small-scale process, which, by continuously satisfying the needs of a particular unit or particular occupational category, provides a stream of specialists on the intermediate level for the economy as a whole. In the Soviet Union this process is embodied in the system of secondary specialized educational establishments. This type of training, centralized and coordinated as it is in the Soviet Union, receives far more attention than our system of semiprofessional education, and it is given enormous publicity as an undertaking unmatched by any other country.

To some extent this is justified, since in other industrialized countries and in the American educational setting in particular, no such great significance is attached to formal semiprofessional training. We do not even know how many people in the United States have such education, as it is extremely difficult to apply educational criteria to the broad categories of American semiprofessionals who are variously classified as technical, clerical, and managerial employees. We can only estimate from census data and special surveys the educational attainment in each occupational category. Usually we are concerned with college graduates with 4 or more years of higher education (see ch. VI). But whatever the education of the several million persons in semiprofessional occupations in the United States may be, the fact remains that in all probability they have less *formal specialized* training than their counterparts in the Soviet Union. This does not mean that the United States has fewer semiprofessionals, but it probably does mean fewer specifically and formally trained persons in occupations at the intermediate level.

Soviet semiprofessionals are called upon to perform certain minor supervisory, managerial, and supporting functions. This is also frequently true of semiprofessionals and technicians in the United States. The difference, however, lies in the fact that in the Soviet system, because of the extent of formal training and because of the emphasis put upon it, semiprofessional specialization carries with it special social status. Because of their relative scarcity, formally trained semiprofessionals in the U.S.S.R. were

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at first singled out as a group of "specialists." Then, as training expanded and improved, a certificate indicating completion of specialized semiprofessional education came to command not only prestige, but also pay differentials, promotion preferences and other economic and social advantages.

It is likewise difficult to find an equivalent to Soviet semiprofessional schools in the American educational setting. There are very few technical institutes in the United States. Usually they accept high-school graduates and the training lasts about 2 years. In industrial fields they are comparable to Soviet technicums; in other fields, they are much less so. In general, American technical high schools do not offer training similar to that given in Soviet semiprofessional schools. Some training, such as that offered in the junior colleges in California, is similar, but how far the comparison can be made in qualitative terms is difficult to tell.

2. *Coordination of Semiprofessional Training*

Until recently secondary specialized schools in the Soviet Union were operated, financed, and maintained by the individual ministries in charge of the various branches of the economy. When the regional economic councils (*sovnarkhozy*) were set up in 1957, a large number (833) of semiprofessional schools were transferred to their jurisdiction. Appendix table III–C–2 tabulates Soviet semiprofessional schools according to their subordination and geographic location in the union republics of the U.S.S.R. as of January 1959. The information was compiled from Soviet primary sources and is based on the actual identification (i.e., by name and street address) of each institution. The total (3,069) thus obtained diverges from the officially reported grand total (3,346) by some 277 institutions.[81] This discrepancy cannot be readily explained, save for certain omissions which are known to exist in the official figures; they concern, for example, semiprofessional schools for Soviet police, several technicums of the aircraft industry, and a number of other institutions.

Also until recently, semiprofessional school curricula, syllabi, textbooks, instruction methods, etc. were supervised by the Main Administration of Secondary Specialized Training of the Ministry of Higher Education, but this has now been replaced by a Ministry of Higher and Secondary Specialized Education, which has counterparts (ministries or state committees) in the various republics.[82] The U.S.S.R. Ministry has a Division of Secondary Specialized Education, which, as in the past, controls programs, enrollment quotas, and the placement of graduates. All actual operating functions remain with the respective ministries or regional economic councils.

The aim of instruction in the semiprofessional schools is to train the students in skills and knowledge that will qualify them for employment on the intermediate levels of professional competence. Even though these specialists are prepared for the intermediate levels, their curriculum often includes some of the same courses offered to professionals at institutions of higher learning; this is done on the assumption that the professionals and semiprofessionals will be closely associated in their work. The Soviet press occasionally complains that in various fields, notably in engineering, the program of instruction in the technicums is not only modeled upon the corresponding specialty offered by a higher educational establishment, but even partly duplicates their syllabi. It is the argument of the public critics that since semiprofessional training has aims different from those of higher education and since semiprofessional school students lack the more extensive preparation of students in higher educational establishments, such programs of instruction often are responsible for the unduly large number of failures among semiprofessional school students. Notwithstanding such complaints, however, the entrance requirements and the general curriculum make it obvious that the program of instruction in the semiprofessional schools is in fact considerably more limited than that in higher educational establishments.

3. *Specialties and Specialization in Soviet Semiprofessional Schools*

Soviet semiprofessional schools, including their organization of studies, are patterned very

[81] Appendix table III–C–1.

[82] See further discussion in chs. I and IV.

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closely after the Soviet higher educational establishment.[33] At the time of entering, a student must decide upon his field of study which, upon completion of his training, will lead to a certificate bearing evidence of his specialty. The training specialty (*spetsial 'nost'*) is in effect the occupational designation of the future specialist. All types of secondary specialized education in the U.S.S.R. are *functionally* oriented to suit employment requirements, and the setting up of specialties is a reflection of such needs. These specialties are approved by the Ministry of Higher and Secondary Specialized Education, and for each specialty there is devised a special program of instruction, which is also centrally approved.

At one time the number of semiprofessional school specialties was close to 1,000. In 1955 there were 575 specialties, which were said to have been consolidated to 349 by 1957.[34]

Appendix III–B–1 presents a fairly complete listing of known specialties in Soviet semiprofessional schools as of January 1959. They are designated by a decimal code system, and individual specialties are arranged by specialty groups and branches. Based on this full listing, table III–3 gives a tabulation of semiprofessional school specialties by code designation and specialty groups. The tabulation contains all identifiable specialties listed in Soviet manuals for semiprofessional school applicants [35] and in certain other sources.[36] It is not fully exhaustive, however, because not all semiprofessional schools are included in the Soviet data. Table III–3 below accounts for 373 specialties, three-quarters of which are for industrial technicians and aides. From the gaps in the number sequence of the decimal code listing, it seems plausible to assume that at least another 20 specialties are in existence.

TABLE III–3.—*Number of known specialties in Soviet semiprofessional schools as of January 1959*

Specialty group code	Branch and specialty groups	Number of known specialties
	I. Technical specialties in engineering and other industrial fields, total	289
0100	Geology and exploration of mineral deposits	6
0200	Exploitation of mineral deposits	11
0300	Technical specialties in power engineering	14
0400	Metallurgy	17
0500	Machine building and instrument construction	82
0600	Electrical machine building and electrical instrument construction	22
0700	Technical specialties in radio engineering and communication	13
0800	Chemical technology	20
0900	Timber and wood processing technology, cellulose, and paper manufacturing	10
1000	Technology of food products industry	19
1100	Technology of consumer goods industry	25
1200	Construction	19
1300	Geodesy and cartography	5
1400	Hydrology and meteorology	6
1600	Transportation	20
	II. Agriculture and forestry, total	12
1500	Agriculture and forestry	12
	III. Socioeconomic specialties, total	29
1700	Economics	29
1800	Jurisprudence	Not known.
	IV. Medical and health specialties, total	9
1900	Public health, medical aides, dentists, nurses, and physical culture specialists	9
	V. Educational-cultural services, arts, and entertainment field specialties, total	34
2000	Educational and cultural services	7
2100	Arts and entertainment	27
	Grand total	373

Source: Appendix III–B–1.

As a final note, it may be said that there is greater fragmentation of specialized training in the semiprofessional schools than in the institutions of higher education. This is particularly evident in the important engineering-industrial branch within which 289 specialties are offered by the technicums, as compared to 181 for engineering higher education. A similar relationship, at a lower ratio however, holds also for the total number of specialties in the two systems.

4. *Types of Instruction Programs*

Soviet semiprofessional schools, like the higher educational establishments, operate three basic types of instruction programs: full-time day,

[33] See ch. IV. We will not dwell upon as many details of the organization of instruction programs, specialties, and institutions on the secondary specialized level as we do in regard to higher education in ch. IV. The reader interested in detailed explanations is urged to proceed first to the relevant sections on types of programs and specialization in ch. IV before continuing with the corresponding topics in ch. III below.

[34] *Narodnoe obrazovanie*, No. 7, 1958, p. 18.

[35] *Sprav SSU*, for the appropriate year.

[36] E.g., the Soviet press and the journal *Srednee spetsial'noe obrazovanie*. In one issue of the latter (*SSO*, No. 5, 1959, pp. 50–63), there is a listing of specialties (incomplete) with indication of the required work skill for which each semiprofessional school student must now prepare in a given specialty.

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TABLE III–4.—*Structure of enrollment in Soviet semiprofessional schools, by type of attendance, 1940, 1957, and 1959*

Type of enrollment	Year end 1940		Year end 1957		Year end 1959	
	Enrollment	Distribution in percent	Enrollment	Distribution in percent	Enrollment	Distribution in percent
Full-time day	787,000	80.9	1,259,000	64.9	1,067,000	56.0
Part-time evening	32,000	3.2	281,000	14.4	318,000	16.7
Total regular	819,000	84.1	1,540,000	79.3	1,385,000	62.7
Extension-correspondence	156,000	15.9	401,000	20.7	523,000	27.3
Aggregate total	975,000	100.0	1,941,000	100.0	1,907,000	100.0
Of which all types of part time	188,000	19.1	682,000	35.1	841,000	44.0

Sources: Appendix tables III–A–1–S and III–A–1–E.

part-time evening, and part-time extension-correspondence. Appendix tables III–A–1–S and III–A–1–E present figures on enrollment by type of program for various years. Table III–4 summarizes these data for 1940, 1957, and 1959.

In 1957, as compared with 1940, enrollment in all types of part-time programs showed a three-fold increment and the share of enrollment in part-time programs increased from 19 to 35 percent of total enrollment. In recent years this trend has been accelerated further, and in 1959 there were 841,000 semiprofessional school students enrolled in part-time programs, which constituted 44 percent of total enrollment.[36a] Nevertheless, the semiprofessional schools still have fewer part-time students than the higher educational institutions. On the other hand, part-time *evening* programs are emphasized more strongly in the semiprofessional schools (17 percent) than in higher education (9 percent); the latter places greater emphasis on extension-correspondence training (semiprofessional schools—27 percent; higher educational institutions—41 percent). The lesser emphasis on part-time programs in the semiprofessional schools is probably due to the fact that applied instruction, which is prevalent in these institutions, requires more face-to-face contact with instructors, and also because the semiprofessional school students are usually younger and do not hold full-time jobs.

A recent campaign, however, has pointed out the need to expand extension-correspondence education in the semiprofessional schools.[37] It can be expected that because of the shortage of young people which will make itself felt during the next few years (see the discussion of the recent drop in semiprofessional school enrollment below), the semiprofessional schools will have to adjust their instruction schedules so as to accommodate more evening and extension-correspondence students. It is anticipated that by 1965, 50 percent of semiprofessional school students will attend on a part-time basis.[38] The success of such a readjustment, particularly in regard to increases in evening programs, will depend not only upon the semiprofessional schools themselves, but also on such outside factors as the rate of student employment.

Many young people who want to study in the evening face serious difficulty in adjusting a daily schedule of full-time work to part-time schooling. This difficulty arises from the tight employment schedule which part-time students must maintain.[39] It was reported, for example, that because of the massive increase in the number of students enrolled in extension-correspondence courses and evening divisions—involving in some Moscow manufacturing enterprises as much as 25 percent of all the practical engineers and technicians employed—"it is impossible, without damaging production, to allow all who study in the evening to work only one

[36a] In October 1960 the aggregate enrollment in semiprofessional schools was 2,059,000, of whom 969,000, or 47 percent, were in part-time programs (*SSSR—Tsif—1960*, p. 511). Total acceptances were 769,000 in the fall of 1960, almost half of them in part-time programs.

[37] *Pravda*, Dec. 1, 1959.

[38] Kotov, *op. cit.*, p. 137.

[39] *Rabochaia gazeta*, Jan. 23, 1959 (story entitled "I Want To Study").

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[i.e., day] shift." [40] Problems of this nature are faced not only by semiprofessional school students, but by higher education students as well.

5. *Entrance Requirements and the Selection of Students*

Before discussing the specifics, it is worth noting that the admission policies for semiprofessional schools have always been related to the supply of applicants. We do not know the admission ratios in the semiprofessional schools. It is clear, however, that in the 1930's there often were more vacancies than qualified applicants. In the postwar years and the early 1950's, on the other hand, there was undoubtedly a great surplus of applicants. For instance, a 1953 regulation stated that if the number of applicants for each vacancy exceeded five, acceptances of applications could be terminated prior to the usual final date.[41] Premature closure of the application deadline indicates that there were instances when more than five applicants sought admission for each vacancy which existed.[42]

In the early 1930's when the supply of applicants was limited, students with even less than 7 years of regular education could be admitted. Furthermore, wholesale transfers of students from the upper grade (7,8,9) of regular school to semiprofessional schools were then a common occurrence. Since that time, however, the selection of applicants has become progressively more stringent, and a minimum of 7-year education has become an absolute requirement.

Before the Second World War, those who had completed *more* than seven grades of regular school could enter a semiprofessional school and gain advanced course standing, thus reducing the length of required attendance. This practice was soon terminated. Today, those students who have completed the regular 10-year school may enter a semiprofessional school program of 1½ to 2½ years. Those who have completed 8 or 9 years of regular education are accepted by the semiprofessional school on an equal basis with 7-year-school graduates. Because of the evident abundance of applicants in recent years, some semiprofessional schools (such as all dental schools and semiprofessional schools of jurisprudence, and most pedagogical and engineering schools) began, in 1954, to accept *only* graduates of the regular 10-year school.[43] In the last 7 years one specialty after another has been declared "reserved" [44] for 10-year-school graduates only. Many fields of specialization now require 10-year education for admission, and almost ¾ of semiprofessional school enrollment is now composed of students with completed 10-year education.

The growth in the number of acceptances from among 10-year-school graduates was very rapid during the mid-1950's. In 1950 there were practically no such entrants. In 1954 there were 25 percent,[45] but in 1956 the proportion had increased to 66 percent, with the quota for 1957 set at 72.3 percent.[46]

Until the mid-1950's, however, the semiprofessional schools accepted graduates of the Soviet 7-year school in the age group 14 to 30, with the majority of entering students probably younger than 18. The process of selection and admission of students to semiprofessional schools is similar to that practiced in Soviet higher educational establishments.[47] Obviously, in terms of preparation, subject-matter coverage, and types of entrance examinations, the requirements are different; but the mechanics of screening, the procedure of admissions, required documents, etc., are about the same as those applicable in institutions of higher education and discussed in detail in chapter IV. The specifics of entrance regulations for the academic year 1959–60, as presented in appendix III–AR, can be compared with the admission rules for higher education spelled out in appendix IV–AR and in the text of chapter IV.

All semiprofessional schools used to fill vacancies by competitive examinations in three subjects: the Constitution of the U.S.S.R., Russian

[40] *SSO*, No. 9, Sept. 1958, p. 5.
[41] *Sprav SSU–1953*, p. 13.
[42] Unlike an applicant in the United States, a Soviet student cannot apply to several institutions to increase his chances of being accepted, because the *original* certificate concerning previously completed education must be surrendered by him before he is permitted to take the entrance examinations.
[43] *Sprav SSU–1954*, p. 3.
[44] There are numerous stories in *SSO* concerning the change from "long" to "short" programs to suit the needs of 10-year- rather than 7-year-school graduates.
[45] *Izvestia*, July 2, 1955.
[46] *APS–NarObr–1957*, p. 368.
[47] App. III–AR gives a full translation of the rules for admission, competitive requirements, preference clauses, and procedures for selecting applicants for semiprofessional schools.

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language and literature, and mathematics.[48] In March 1955, however, there was a revision in the rules, the first major one in 15 years. It was stipulated that those entering semiprofessional schools in the fields of industrial technology, agriculture and economics would be required to take examinations in Russian composition and mathematics only. Those entering other fields would take examinations in the history of the peoples of the U.S.S.R. (instead of the Soviet Constitution only) and in Russian composition.[49] As evident from the 1959 information on admission rules in appendix III-AR, these two different sets of examinations remain the present requirement. The examinations are given by the respective institutions, but their content is prescribed uniformly throughout the Soviet Union. In addition, some schools give supplementary entrance examinations in vocational subjects; for example, draftsmanship for architectural schools, music for performing arts schools, sports for physical culture technicums, etc.

Chapter IV discusses in detail the profound changes in the admission rules which have taken place in higher education, and similar changes have occurred in regard to semiprofessional school admission as well. These changes have three basic aspects. Preferences based on the academic record have been abolished. Instead, preferences based on the record of prior gainful employment have been introduced, and up to 80 percent of the entering class places have been reserved for persons with employment experience or for veterans. Finally, the admission committees were restructured so as to include Communist Party, Komsomol, and trade union representatives, who not only take into consideration the entrance examination scores, but also review the applicant's character references, which must now be submitted from the party, from management, and trade unions.

The admission rules for the entering class of 1960[50] contain a provision that persons with 2 or more years of gainful employment and officers discharged from the armed services have priority among quota applicants, providing that they can score a passing grade on the entrance examinations. Furthermore, a provision has been introduced that first priority (extra-quota) in admission will be given to persons *assigned* to full-time study by various enterprises.

6. *Financial Aid to Semiprofessional Students*

As already indicated in chapter I, the majority of semiprofessional students receive stipends. The proportion in 1938 was about 85 percent.[51] Prior to the war, these stipends were paid out indiscriminately to all successful and even failing students as long as they kept up attendance. For about 3 years after the introduction of tuition fees, there was also some uncertainty about who was qualified to receive a monthly stipend. In 1943, however, a monthly stipend ranging from 80 to 330 rubles was established for those who received passing grades in all subjects, and for those who received honor grades there was a 25-percent bonus.[52]

In recent years it is reported that about 76 percent of all semiprofessional students received a basic stipend.[53] The amount of the stipend is differentiated by field of specialization and is increased by course seniority. Engineering and upper course students receive larger stipends. Although the amount of the stipends and the proportion of students receiving them in Soviet semiprofessional schools offer less incentive than is the case in higher education, such governmental aid is a factor in attracting students to semiprofessional occupations.

Programs of Instruction, Curricula, and Syllabi in Semiprofessional Schools

The instruction programs of semiprofessional schools are now being revised in accordance with

[48] The mathematics examination included arithmetic (as far as percentages); algebra (as far as systems of equations of the first order with two unknowns, with numerical and literal coefficients); geometry (as far as triangles, polygons, trapeziums, circles, tangents, and inscribed and circumscribed circles). For further details, see MVO SSSR, M. Movshovich (comp.), *Tekhnikumy. Osnovnye postanovleniia, prikazy i instruktsii* (Technicums. Major Decrees, Ordinances and Regulations), Moscow, 1947, especially pp. 26, 57, 62–64; *Sprav SSU* for current years.

[49] *Trud*, Mar. 8, 1955.

[50] *Pravda*, Apr. 7, 1960.

[51] *Kul't Stroi–1940*, p. 115.

[52] MVO SSSR, Movshovich, *op. cit.*, p. 217.

[53] *Dos–1957*, p. 275. Another Soviet source reports that, in 1957, 72 percent of semiprofessional students received monthly stipends (Komarov, *Ekonomicheskie osnovy podgotovki*, p. 136).

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the objective of the educational reform, to unite secondary specialized education (as well as higher education) with practical experience and "socially useful labor." [54] In accordance with this objective, the curricula for day students in semiprofessional schools are being changed so as to (1) expand applied instruction by introducing the requirement of employment experience during the course of training; (2) give every semiprofessional school student preparation in a skilled worker's trade; and (3) combine part-time education with full-time employment either during the entire educational program or particular phases of it.

Until 1953 the length of training in most semiprofessional schools (and in all engineering technicums) was 4 years, except for certain disciplines, such as the socioeconomic fields, medicine,[55] and the arts, which required a 2- or 3-year course only. In 1953 it was decreed that for those semiprofessional schools accepting 10-year-school graduates only, the training should last about two years (actually ranging from 1½ to 2½ years, depending upon field of study).

The current curricular reorganization, due to the educational reform, will increase somewhat the length of study. Accordingly, the former 4-year program will take up to 4½ years to complete, and the former 2-year program, up to 2 years and 4 months; the former 1½ to 2½-year programs will be extended by 4 to 6 months.[56] Furthermore, in order to meet the requirements of employment experience and skill qualifications, the programs are being reorganized so as to put the second year in the 2-year program and the third and part of the fourth year in the 4-year program on a part-time basis, mostly of the evening but sometimes also of the extension-correspondence variety. The required length of full-time employment in conjunction with the semiprofessional school program is to be 1 to 1½ years. According to present plans, then, the length of study will be 4 to 4½ years in schools for 7- (or 8-) year-school graduates, and 2 to 2½ years in those for 10- (or 11-) year-school graduates. Even day students will spend one-third to one-half of total instruction time as full-time employees and part-time students.

The acquisition of a skilled worker's qualification is to be accomplished by the student in his first or second year of study largely through work in school workshops or in special apprenticeship shops in large plants. A roster of about 1,000 skilled worker occupational titles has already been announced,[57] and it ranges from metalworkers to electricians, from laboratory aides to plumbers to truckdrivers and lathe operators. During their first 2 years of study, the students must acquire in any one trade a proficiency grade of 4 to 6 on the Soviet 9-grade rating scale (or 3 to 5 on the new 8-grade rating scale). These measures put more applied emphasis on the functional orientation of semiprofessional education than ever before.

The question inevitably arises as to why the skilled-worker preparation for students in all semiprofessional schools, and particularly those in industrial technicums, is necessary at all. The official version most often given is that these measures are designed to improve the graduates' qualifications. In reality, however, they are more deeply related to the problem of employment of industrial technicum graduates.

All Soviet engineering-industrial technicum graduates are designated as technicians by training specialty. In the past, plants usually placed new graduates in technical and supervisory positions commonly designated by occupational category as engineering, managerial and technical personnel (*ETMP*).[58] This category excludes, however, technicum graduates employed in production who do not have supervisory functions. On complex jobs some technicum graduates are employed in the occupational category of workers. Undoubtedly in complex and highly automated industries, such as petroleum or machine building, where Soviet technicum graduates occupy skilled worker jobs (and in the United States would be so classified), such use of technicum graduates may be justified. But it may not be justified to employ many technicum graduates in routine skilled-worker jobs.

As revealed in a Soviet report,[59] there is

[54] See the relevant section in appendix I—ERL.

[55] Semiprofessional training in medical fields was reorganized in 1953 (*BSE–2d*, vol. 26, p. 639).

[56] *SSO*, No. 9, 1959, p. 3 (article by V. S. Rumiantsev, Deputy Minister of Higher and Secondary Specialized Education for semiprofessional schools).

[57] *SSO*, No. 5, 1959, pp. 50–63.

[58] See definition and discussion in ch. VI.

[59] Made at a nationwide conference of the heads of divisions for semiprofessional education of the regional economic councils, in Moscow, May 1958 (*SSO*, No. 7, 1958, pp. 3–25, especially pp. 14–15).

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"widespread saturation of employment of technicum graduates" in *ETMP* positions and that most jobs now open to new graduates are in production directly, more specifically in workmen's jobs themselves. This is the real consideration behind the widespread introduction of skilled worker preparation for all technicum graduates. In fact, from the point of view of the present pattern of employment of technicum graduates in *ETMP* positions, a cutback in training has been advocated by representatives of the regional economic councils.[60] This is not the official position of Soviet planners, who still insist that "we should stimulate the training in technicums by all possible means,"[61] for apparently they anticipate an increasing employment of technicum graduates in skilled-worker occupations. The channeling of technicum graduates into skilled-worker jobs is also directly related to demographic trends in the Soviet labor force, since the intensified demand for skilled labor is expected to be met partly through placing technicum graduates in these jobs rather than in *ETMP* positions.

Whatever the case, the regulation that every semiprofessional school graduate must have a skilled worker's qualification in addition to his semiprofessional specialty[62] is thus simply a recognition of a situation which has been in existence for several years. Many semiprofessional graduates have in fact been employed in skilled-worker occupations. In 1956, for example, some 60 percent of all technicum graduates in the petroleum industry were employed in such occupations.[63] Similarly, many plants in machine building have reported that a substantial proportion of semiprofessionals are employed in skilled-worker occupations. The issue, however, is not higher skill requirements because of advances in technology, but largely the saturation in semiprofessional employment demand.

Without these realistic considerations, some of the current curriculum reform measures are hard to grasp. A Soviet specialist in technicum education stated not long ago: "For a number of years after the Second World War there was a steady cry from industry—'We need more technicians!' Technicums were accepting anyone—even the least qualified. Now the demand has been satisfied, and the main problem for technicum training consists in the improvement of its quality."[64] The immediately relevant question is: What constitutes improvement in the quality of technicum education? No Soviet source has given an answer other than reiterating the point that "improvement" can be achieved only by bringing the training "closer to production." For industrial technicums this may be the case, but it would not apply universally. Yet the educational reform postulates that skilled trade specialization, in addition to a semiprofessional specialty, be required of semiprofessional students in all fields.

1. *General Structure of the Curriculum*

On the basis of available information concerning the new curricula for semiprofessional schools, it appears that the average number of hours of instruction per week is about 40, with the range spreading from 35 to 46 hours. These instruction loads, unmatched either in America or West Europe, were commonplace in the past; today the burden is in fact even heavier, since full-time employment combined with part-time (evening) study is now compulsory in the second to fourth years of training. During these periods students, while employed for 40 to 46 hours per week, must spend an additional 16 hours per week in evening classes. In the past the academic year usually lasted 30 to 32 weeks and the total number of required instruction hours averaged between 1,200 and 1,300 per year. The new programs, some with 42 and even 46 instruction weeks per calendar year, will have 1,376 or more instruction hours. In engineering technicums, where required class attendance is usually higher, the load will in some cases exceed 1,500 instruction hours.

As far as the programs of instruction are concerned, it is interesting to note that even though the curriculum is prescribed by a central author-

[60] *Ibid.*, p. 4.
[61] *Pravda*, Dec. 11, 1959.
[62] *SSO*, No. 5, 1959, pp. 45–63.
[63] M. Ia. Sonin, "O putiakh pod'ema kul'turno-tekhnicheskogo urovnia trudiashchikhsia" (Concerning the Improvement of the Cultural-Technical Level of Employees), in Akademiia Nauk SSSR (V. K. Ostrovitianinov, ed.), *Voprosy stroitel'stva kommunizma v SSSR* (Problems of Building Communism in the U.S.S.R.), Moscow, 1959, p. 366.
[64] *SSO*, No. 7, 1958, p. 16. Statement by the Director of the Leningrad Technicum of the Vacuum Tube Industry.

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ity (i.e., the Division of Secondary Specialized Education of the Ministry of Higher and Secondary Specialized Education, with the concurrence of the economic agency for whose benefit the semiprofessionals are being trained), it varies from school to school more significantly than in Soviet higher education. While it is true that educational administrators are in favor of stable curricula, programs are in actuality reviewed (and often revised) every 3 or 4 years.[65] Thus despite Soviet claims, stable programs have not existed in the past and present developments are only adding more flexibility.

Although the programs themselves are not as stable as Soviet educational administrators would have them, we can nevertheless speak of a standard *structure* in regard to the Soviet semiprofessional school curriculum. Up until now, instruction hours and the content of individual courses have been changing, but the structure has remained largely unaltered. The number of subjects of instruction for the 4-year program usually ranges from 20 to 25, depending upon specialty, and the number is cut by at least 5 for students entering advanced programs after completion of the 10-year school. The subjects of instruction in the 4-year program may be arranged into three basic groups:

(A) *General (academic) education subjects.*—This group consists of courses which are usually found in the upper grades of the regular secondary school: Russian language and literature, history, foreign language, mathematics, physics, chemistry. In 1956, political economy, a straightforward indoctrination course, was added to semiprofessional school programs. Also included in this first group are physical education and military training, both of which are required subjects for all male students.

(B) *General technical and specialized subjects.*—This group consists of technical and specialized courses and is sometimes divided into two subgroups separating general technical or nonspecialized courses from courses of narrow specialization. The number of subjects in the group ranges between 15 and 20, with at least 5 devoted to nonspecialized subjects. The composition of this group of courses varies not only from one field of study to another but even within a given field, according to specialization.

(C) *Applied instruction.*—This group of subjects consists of applied practical training in school workshops, in industrial practice, in clinical practice, in teaching assignments, etc. These practical skill courses have always been offered in Soviet semiprofessional schools, but the current curricular revision adds to them a further component—full-time employment in industry or other economic establishments.

In addition to these subjects of instruction, there are 1 or 2 weeks set aside at the end of each term for examinations. In some fields (e.g., engineering-industrial), there is the added requirement of a report, called "diploma project" like its counter-part in higher education, to be prepared for graduation. About 9 weeks are allowed for the preparation of this project and for final graduation examinations.

The major difference between a regular 4-year curriculum and an advanced 2-year curriculum is that the students in the latter are permitted to skip most of the general academic courses, and sometimes the required length of instruction in other courses (general technical) is slightly reduced.

It is a bit more difficult to generalize about the structure of the Soviet semiprofessional school curriculum than about instruction programs in Soviet higher education. On the basis of the programs examined for this study and various clues in Soviet sources, the following remarks would appear to be justified. In the past the 4-year curricula were based on 5,000 to 6,000 instruction hours, including applied training. In advanced 2-year programs the number of hours was reduced by 1,500 to 2,000 and the general academic subjects were excluded.

The distribution of instruction time among the different subject groups in 4-year programs ranged as follows:

	Percent
General academic subjects	25–30
General technical subjects	20–25
Specialized technical subjects	20–25
Applied training	25–30

The increased instruction time provided for in the present curricular reform will be devoted almost exclusively to applied training. This is

[65] *Ibid.*, p. 6.

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evident from a comparison of the number of instruction weeks by type of activity in pre-1958 and the new 1959 programs, as indicated in table III–5.

On the basis of data giving the total number of hours of instruction per week and the amount of time by instruction weeks allocated to different types of activity, we can estimate

TABLE III–5.—*Comparison of time allocated to different types of activities in the existing and revised technicum curriculum (for construction technicians, specialty code 1202)*

Type of training activity	Curricular instruction weeks		Comment
	Old pre-1958	New 1959	
Classroom instruction (all theoretical subjects: general and specialized)	106	107	No significant change (gain, 1 week).
Applied instruction in workshops	21	20	No significant change (loss, 1 week).
Applied instruction in industry and employment requirement	19	53	Major change (gain, 34 weeks).
Examinations	12	6	Loss of 6 weeks.
Diploma project	9	9	No change.
Total	167	195	Gain, 28 weeks.
Recess and furlough during study	32	32	No change.
Grand total	199	227	Gain of 28 weeks.

Source and Notes: *SSO*, No. 7, 1959, p. 61. The number of instruction hours per week ranges from 36 to 46.

TABLE III–6.—*Instruction time budget in the revised curriculum for a Soviet technicum of the construction industry (specialty code 1200), 1959*

[Instruction weeks or instruction hours per year or term]

Year and term of study	I 1–2	II 3–4	III 5	III 6	IV 7	IV 8	V	Total
Type of study	FTD	FTD	FTD	PTE	PTE	FTD	FTD	
Type of instruction:								
Classroom instruction W.	27½	27½	15	(25)	(16)	19	18	107
IH.	984	984	525	(400)	(256)	684	648	[b]3,825
Applied training, total W.	13½	13½	2	25	16	9	.....	79
IH.	492	492	92	1,150	736	414	.....	[c]3,376
Workshop study W.	13½	13½	2	.....	.....	.....	.....	29
IH.	492	492	92	.....	.....	.....	.....	1,076
Work in industry W.	.....	.....	.....	25	16	[a]9	.....	50
IH.	.....	.....	.....	1,150	736	[a]414	.....	2,300
Total W.	41	41	17	25	16	28	18	186
IH.	1,376	1,376	617	1,150	736	898	648	7,201
Examinations W.	1	1	1	1	1	1	.....	6
Diploma project W.	.....	.....	.....	.....	.....	.....	7	7
Instruction hours, total	36	36	(a)	(a)	(a)	(a)	36	.....
Classroom	24	24	35	16	16	36	36	.....
Applied	12	12	46	46	46	46	.....	.....
Recess or furlough W.	10	10	6	2	2	4	.....	34

Sources and Notes: This time budget is a reconstruction of a new curriculum schedule reported in *SSO*, No. 6, 1959, pp. 4–5. It is designed for students entering technicums with a 7-year education.

FTD—Full-time day study; PTE—Part-time evening study; W—Weeks; IH—Instruction hours.

[a,c] This period is the so-called prediploma practice. It lasts 9 to 11 weeks. If the 11-week option is taken, it would total 506 hours. This version would increase the total applied instruction time to 3,468 hours during the entire program (note c).

[b] Excluding evening courses while on the job; if they are counted, the total would be 4,481 classroom instruction hours for the entire program.

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TABLE III–7.—*Basic curriculum of Soviet semiprofessional schools as revised for 1960*

Subjects of instruction or activity areas	Instruction hours		Notes on instruction time variation for different specialties
	General (for 7- or 8-year school graduates)	Advanced (for 10- or 11-year school graduates)	
I. General academic subjects*.....	1,990	300	
A. Humanities and Social Sciences.	1,020	100	
1. Russian language and literature.	300	none	All specialties in pedagogy, cultural services, arts, library science, etc., require substantially more time (up to 2.5 times as many instruction hours).
2. History of the U.S.S.R.	280	none	Increased to 510 hours in pedagogical and cultural service fields by addition of modern history and history of the Communist Party of the U.S.S.R.
3. Foreign language (or native language).	180	none	Foreign language required in all schools with instruction in Russian language. In schools with instruction in native language, native language is required and foreign language is *optional* elective.
4. Political economy....	260	100	
B. Science subjects.....	730	100	Required in *all* schools regardless of specialty, though in differing amounts.
5. Mathematics (algebra, geometry, trigonometry, and introduction to calculus).	400	100	Ranges from 200 to 400 hours, depending upon specialty.
6. Physics.....	210	none	Cut down to 130 instruction hours in medical and cultural service fields.
7. Chemistry.....	120	none	Cut down to 70 instruction hours in arts and cultural service fields.
C. Other.....			
8. Physical education and military training.	240	100	All specialties.
II. General technical subjects.....	820	760	In other than industrial fields these subjects are replaced by expanded coverage of subjects in group I and special topics in accordance with specialty.
9. Technical drawing and drafting.	240	180	Increased to 260 instruction hours in architectural and construction fields.
10. Theoretical and engineering mechanics.	260	260	Increased to 360 instruction hours in machine building and other mechanical engineering technicums.
11. Electricity and general electromechanics.	130	130	
12. Machines and mechanisms (general introduction to engines).	70	70	
13. Materials technology.	120	120	
III. Specialty subjects, total.....	1,250	1,250	
a. Basic specialization.....	800	800	Depending upon specialty, ranges from 600 to 1,000 hours. No rigid requirement.
b. Narrow specialization.....	450	450	Depending upon specialty, ranges from 300 to 450 hours. Definitely should not exceed this.
IV. Applied Instruction.....	2,400	2,400	
Workshops of the training establishments.	900	900	Depending upon specialty, ranges from 600 to 900.
Industrial experience and employment.	1,500	1,500	General requirement for all schools regardless of specialty and ranges between 1,450 and 1,500 instruction hours.
Grand total.....	6,460	4,710	

Source and Notes: Information by subject is from *SSO*, No. 5, 1959, pp. 48–49. Curriculum construction is the author's.
* Exception is physical education and military training, which are obviously not academic subjects, but are considered general subjects and universally required (the latter of male students only).

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what the new instruction time budget will be in the case of one specialty group—construction industry technicums, as presented in table III–6.

Obviously this estimate of the total time budget is valid as an approximation only, especially as far as the allocation of time for gainful employment is concerned, which in the present case is remarkably high for a 4-year technicum. It is to be noted particularly that the technicum curriculum proper, i.e., classroom instruction only, is based on about 3,800 hours. The other part of the program—approximately 3,400 hours—is included as required workshop activity and industrial employment. These two separate parts of the technicum program—course instruction and applied activity—must be clearly distinguished, for when we examine the technicum curriculum based on individual course syllabi, it refers only to the formal instruction, i.e., basically to the some 3,800 hours which are devoted to courses. To the extent that it is correct and representative, the estimate indicates, however, that the total technicum instruction time (including the full-time employment requirement) is being raised by about 1,500 to 2,000 hours as compared with the prereform curriculum. As already stated, most of this additional time will be devoted to applied instruction. Formal course instruction remains about the same, i.e., an average of about 1,000 hours annually.

2. *Revised 1960 General Curriculum for Soviet Semiprofessional Schools*

The Division of Specialized Secondary Education of the Ministry of Higher and Secondary Specialized Education received from various semiprofessional schools so many requests to clarify the new curriculum that in May 1959 it issued an official "basic outline" of the new program.[66] The Ministry's regulation stipulated the minimal number of instruction hours to be devoted to any given subject, sometimes stating the range of hours in a given subject for different specialties and always making separate provision for the 4-year (i.e., 4 years and 4 months) and 2-year (i.e., 2 years and 4 months) program. By taking this information for individual subjects of instruction, a basic curriculum for both types of semiprofessional programs has been constructed and presented in table III–7.

This basic outline is to be followed by all individual semiprofessional schools in designing their own programs. The regulation also stipulated that *individual* curricula (i.e., in 400-odd specialties) should not deviate by more than 5 percent from the prescribed limits. The principal concern of the Ministry was with technicum curricula in engineering-industrial fields (i.e., specialty group 0100–1600), and the basic curriculum is primarily oriented towards guidance in these fields. Introduction of the new design and programs began in 1959–60, and full conversion to the new curricula is to be accomplished by 1960–61, which may be an optimistic target for such thorough reorganization.

We already have samples of half a dozen new individual curricula,[67] which were hurriedly prepared for 1959–60, and they reveal that so far, in industrial technicums, there have been no significant departures from the "basic" version. In other fields (agriculture, health), it is expected that the respective ministries will follow suit as far as the general structure of time allocation between general and specialized subjects is concerned.

On the basis of the data in table III–7 we can ascertain the structure of the new curriculum, which is presented in table III–8. As compared with pre-1959 programs, there is a declining share (in percentage terms) of instruction

[66] *Ibid.*, No. 5, 1959, pp. 43–49.

[67] See especially *ibid.*, No. 7, 1959, pp. 58–62.

TABLE III–8.—*General structure of the revised technicum curriculum in the specialties of engineering and industrial technology, 1960*

	General technicums (for 7- or 8-year-school graduates)		Advanced technicums (for 10- or 11-year-school graduates)	
	Hours	Percent	Hours	Percent
I. General academic subjects (of which science).	1,990 (730)	30.9 (11.3)	300 (100)	6.4 (2.1)
II. General technical subjects	820	12.7	760	16.1
III. Specialty subjects	1,250	19.3	1,250	26.5
IV. Applied instruction	2,400	37.1	2,400	51.0
Total	6,460	100.0	4,710	100.0

Source: Table III–7.

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hours allocated to general academic and technical and specialized subjects. The absolute amount of instruction time devoted to these subjects has hardly changed, however. It is also to be noted that the number of hours assigned to general studies, technical and specialized instruction (a total of 4,060) is some 200 hours higher than the figure developed on the basis of the time budget estimate (i.e., 3,825, table III–6 above). As remarked earlier, a total time budget estimate is hazardous, but while it may result in a higher total number of instruction hours than actually provided in the basic curriculum, it gives us the upper limit of the total instruction time *available*. There is, of course, always the possibility that individual programs (i.e., for construction technicians in this case) may differ from the basic program and that the total instruction load in some programs is much heavier than in others.[68] It is obvious, however, that formal course instruction (i.e., excluding applied training) is still based on some 4,000 instruction hours for the 4-year technicum. The main differences among individual curricula for various specialties stem from the differing amounts of time allocated to applied training (workshop and industrial employment).

Table III–7 also reveals interesting differences in the amount of time devoted to general academic studies in the 4-year and the 2-year programs. There is virtually no difference between the two programs in the number of instruction hours devoted to general technical and specialized subjects. As far as general academic subjects are concerned, however, the advanced 2-year program offers almost none (save for the universally required indoctrination courses in political economy, physical education, and military training). It might also be added that even in the 4-year technicums considerably less instruction time is devoted to general academic education than in the upper grades (8–10) of the regular school.[69] How one can speak, under such circumstances, of comparability between technicum education and general secondary school education, as Soviet sources frequently do, is difficult to understand. It is quite clear that Soviet semiprofessional schools are almost exclusively oriented towards specialized education, with strong emphasis upon applied training.

3. *Examples of Technicum Curricula in Engineering-Industrial Fields*

Technicians for Soviet industry, construction, transportation, and communication are schooled in industrial branch technicums. In 1960 in over 1,000 of these institutions there were 900,000 students enrolled in some 290 diverse specialties. The programs of instruction will be discussed in this section.

Until 1957 the only available comprehensive curriculum of Soviet technicum training in an industrial field was a 1951 program of a mining technicum. Some Western analysts[70] have been inclined to believe that mining technicums have had an exceptionally strong program of instruction, particularly since they have frequently been shown, presumably for propaganda purposes, to American visitors. It is true, of course, that the training of technicians for Soviet heavy industries and mining has always received favored treatment in qualitative as well as quantitative terms. It is also true that the prereform technicum curriculum in mining engineering entailed more hours of instruction than curricula in some other fields (largely because of more extensive applied training); but in its overall structure and the number of hours allocated to theoretical and specialized subjects, it was by no means exceptional.

In 1951 the 4-year curriculum[71] prescribed about 6,100 instruction hours. About 24 percent of this time was devoted to general academic subjects (history, language, foreign language, physics, mathematics, chemistry); 12 percent to nonspecialized engineering courses (fundamental engineering and technical drawing); 28 percent to specialized engineering and technological subjects; 33 percent to industrial practice; and 3 percent to sports and military training. However, if laboratory work, prac-

[68] This has certainly been the case in the past, if we compare, for example, technicum programs for radio engineering (appendix table III–B–2, total hours: 5,234) with those for mining engineering (appendix table III–B–3A, total hours: 6,122).

[69] See comparisons in Korol, *Soviet Education*, p. 124.

[70] Cf. *ibid.*, p. 119.

[71] Appendix tables III–B–3–A and III–B–3–B. The first of these tables gives the proposed curriculum; the second reflects the curriculum actually in operation around 1951.

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tical work, and team assignments are considered as applied instruction along with industrial practice, the aggregate time devoted to applied training was about 72 percent, with only about 28 percent left to lectures. Practical and applied instruction was thus a dominant feature of Soviet secondary specialized training even in the past.

Appendix table III–B–2 gives an example of a technicum curriculum in another field of engineering—the training program for electronic technicians in radio engineering (Specialty 0704). Unlike the curriculum for mining technicums discussed above, which was based on the official Soviet *uchebnyi plan* (curriculum) listing the subjects offered and the number of instruction hours in each course, this radio engineering curriculum has been constructed by the author on the basis of the detailed syllabi *(programmy)* for each individual subject of instruction, which tell us exactly what the *contents* of each course are, how many hours are devoted to any given topic within each course, what kind of textbooks and teaching aids are used, etc.[72] Appendix table III–B–2 presents the result, and table III–9 summarizes the structure of the curriculum thus derived.

Despite its hypothetical derivation, this reconstructed program for electronics technicians displays all the usual features of Soviet technicum programs. About 40 percent of all instruction time is devoted to general and specialized technical (engineering) subjects. The remaining time is allocated to general academic subjects and to applied training, with about 30 percent of the total instruction hours for each. The total engineering and applied training subjects consume some 70 percent of the instruction time, this share being almost identical to that allocated for similar purposes in the mining curriculum (72 percent).

TABLE III–9.—*General structure of the Soviet technicum curriculum in engineering, with the specialty radio engineering (specialty 0704), 1958*

	Instruction hours	Distribution in percent
I. General academic subjects..	1,570	30.0
A. General (languages, history, physical education).....	(868)	(16.6)
B. Sciences (mathematics, physics, chemistry).....	(702)	(13.4)
II. General engineering.....	1,103	21.2
III. Specialized engineering.....	1,116	21.4
IV. Applied workshop and industrial practice.....	1,440	27.4
Grand total.....	5,234	100.0

Source: Appendix table III–B–2.

A personal inspection of Moscow's Technicum of Radio and Vacuum Tube Engineering *(Moskovskii Radiovakuumnyi Tekhnikum)* has yielded the following observations:[73] Enrollment was about 600 full-time day students, and the faculty numbered about 90—a favorably low student-teacher ratio. Most instructors were professional engineers. By American standards, the laboratory equipment was excellent and abundant. Workshop equipment was poor. The library was well stocked and included subscriptions to U.S. and West European publications.

A comparison with a U.S. technical institute curriculum in a similar field (industrial electronics)[74] reveals that the Soviet and U.S. programs (in the typical U.S. 2-year program there are only 2,400 instruction hours) are indeed comparable as far as the theoretical content of science and technical courses is concerned. Individual topics and coverage appear to be the same. There is in the American case no counterpart to the applied (industrial employment) exposure. This is the point at which the job-orientedness of Soviet technicum education becomes so strikingly different from our

[72] The author is indebted to Mr. Edward E. Booher, of the McGraw-Hill Book Co., for providing him with copies of syllabi for 23 instruction subjects in radio equipment production *(radio-apparatostroenie)*, decimal specialty code 0704 (see app. III–B–1), which he obtained from Moscow's Technicum of Radio and Vacuum Tube Engineering. These syllabi are usually printed in a limited number of copies (for specialized courses the run was only 300 to 400 copies; for general academic subjects such as mathematics and science it was 20,000 to 30,000) for distribution to instructors only. Although the individual syllabi were issued in 1956, they were still in full use at the time of Mr. Booher's visit during the academic year 1957-58; and no revisions had been contemplated for the next academic year (1958–59). The curriculum can thus be viewed as applying as late as 1958–59, i.e., the last academic year prior to the current curricular reorganization.

[73] Based on author's discussions with E. E. Booher and on his mimeographed notes. See also E. E. Booher, "Some Observations on Soviet Technical Education," *Technical Education News*, vol. XIII, No. 1 (Special Issue 1958), 1–3.

[74] Henninger, *op. cit.*, pp. 205–12. For an actual U.S. curriculum for electronics technicians, see *Wentworth Institute Bulletin of Day Courses, 1960–61*, Boston: Wentworth Institute, 1960, especially pp. 69–75.

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own broader conception of technical training even on this level. Aside from this, some comparability of *basic* training in the two countries does exist.

In recent years other examples of specialized engineering curricula, in terms of subject coverage and time allocation, have become available in the West. A new area of specialization has just been announced in the field of electronic computers, equipment and devices.[75] The curriculum for this field of study specifies 2,066 instruction hours devoted to general and specialized engineering subjects,[76] with the range and course content very comparable to that of the American technical institute program in industrial electronics. On the theoretical level, however, the Soviet program is perhaps more comprehensive than any similar program in the United States. In the Soviet case, general and specialized engineering subjects take up about 34 percent of the estimated 6,100 total instruction hours in the new 1960 curriculum of 4 years and 4 months for the training of electronic technicians for computer service. In terms of its total scope, this program cannot be matched in the United States. In the field of machine building we have another example of a Soviet technicum program which, with its 1,396 hours devoted to special engineering subjects,[77] represents a degree of concentration in engineering topics which probably cannot be matched in comparable American technical institutes.

[75] This specialty is related to the group coded under 0600; see appendix III–B–1.

[76] Total instruction hours: 2,066. Subjects of instruction with the hours in ( ) as follows:

1. Technology of metals (204).
2. Foundations of electrical machinery (237).
3. Theory of numbers (85).
4. Electronics, vacuum tubes and semiconductors (206).
5. Electrical measurements (153).
6. Precision mechanisms, relays, and devices (168).
7. Electrical materials (56).
8. Impulse current technology (impulse generators and modulators) (120).
9. Automatics and telemechanics (117).
10. Continuous action computers (principles of design) (162).
11. Digital electronic computers (216).
12. Component production and assembly (141).
13. Economics and organization of production (138).
14. Industrial safety (63).

This listing is from *SSO*, No. 7, 1959, pp. 58–59. The source also gives briefly the contents of each course.

[77] *SSO*, No. 11, 1958, p. 18.

Two new 1960 curricula [77a] for training technicians-technologists—in the processing of metals by cutting (Specialty 0501) and tool production (Specialty 0504)—call for 4 years, 4 months, of study. They are designed not only to train 7- (or 8-) year school graduates as technicians but also to give them supplemental training as skilled metal workers (grade 3 or 4 on the rating scale). The fourth year in these new "day programs" is devoted to part-time evening study with concurrent full-time employment. The weekly instruction load is 36 hours except for this fourth year, when it is 15 hours per week, in addition to 42 hours of employment. The time budget in weeks in both programs is as follows:

	Weeks
Theoretical (classroom) instruction, full-time	87
Employment experience with part-time study	46
Examination sessions	9
Acquisition of work skill	26
Industrial practice	9
Preparation of diploma thesis	8
Vacations	40
Total	225

The structure of the curricula in the two programs is remarkably similar:

	Specialty 0501		*Specialty 0504*	
	Hours	*Percent*	*Hours*	*Percent*
1. General academic (6 subjects)	1,503	20.4	1,487	20.3
2. General technical (5 subjects)	722	9.8	730	9.9
3. Specialized technical (10 subjects)	1,465	20.0	1,464	20.0
4. Physical education	245	3.3	245	3.3
5. Applied training	3,402	46.5	3,402	46.5
Total	7,337	100.0	7,328	100.0

Counting employment experience, these programs are based on approximately 7,330 hours, of which about 44 percent, or 3,930 hours, are devoted to classroom instruction proper. If on-the-job and applied training (3,400 hours) and specialized technical subjects (1,460 hours) are taken into account, then about 70 percent of the time is spent on applied specialized courses, the remaining 30 percent on academic subjects and general technical courses.

Thus, in the contents of theoretical subjects,

[77a] MVSSO, *Uchebnyi plan podgotovki spetsialistov v srednem spetsial'nom uchebnom zavedenii* (Study Plan for the Training of Specialists in Secondary Specialized Educational Establishments), loose-leaf curricula approved by the MVSSO on Oct. 10, 1959. The author is indebted to Dr. H. R. Beatty, President of Wentworth Institute, and the Engineers Joint Council for making these curricula available. They were obtained directly from the Ministry through the courtesy of D. I. Chuprunov, Deputy Chief, Division of Secondary Specialized Education. The curricula were scheduled for use starting with the fall term, 1960.

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many of the Soviet technicum programs are definitely not inferior to similar programs offered in this country. The overall Soviet program requirement, however, including applied training, cannot be meaningfully compared with any counterpart in the United States because of the strong functional emphasis in Soviet training. Better American technical institutes, such as the Wentworth Institute in Boston, or the technical programs offered by some junior colleges, are much more diversified in content than Soviet technicums. The American schools combine [78] under the same auspices several types of programs which in the U.S.S.R. would be offered separately in individual technicums. In quantitative terms, moreover, the U.S. system of formal semiprofessional and technician training remains of midget size as compared with the Soviet effort in this field.

The question naturally arises whether *all* Soviet technicum training programs are of uniformly high quality, and thus superior perhaps to the American endeavor. This is a matter of personal judgment. One American observer expressed the following view, after a visit to Leningrad's Technicum of the Garment Industry (*Leningradskii Tekhnikum Legkoi Promyshlennosti*): "The worst American trade school is better off in its facilities, staff, calibre of instruction, and type of work the students were engaged in." A comparison of the Soviet Union's better or best programs (i.e., the top priority fields—mining engineering, machine building, electronics) with one of its mediocre ones serves as a reminder that the quality variation in technical education in the U.S.S.R. is as great if not greater than in the United States. Although the Soviet garment industry technicum has the same overall instruction time requirement as other programs (the new program lasts 4 years and 4 months, with about 6,000 instruction hours), with "theoretical" subjects in equal prominence (3,348 instruction hours),[79] qualitywise it is not in the same class at all with electronics technicums for example. The substantial quality variation must be kept in mind when the huge number (250,000 graduates from engineering-industrial field technicums alone each year) of Soviet technicians trained is considered.

[78] See the *Wentworth Institute Bulletin of Day Courses, 1960–61.*

[79] *SSO*, No. 7, 1959, p. 62.

4. *Instruction Programs in Agricultural Technicums*

Agricultural technicums train assistant agronomists, breeding technicians, mechanics, accountants, veterinary aides, etc. In 1959 in the Russian SFSR alone there were in this category 276 day technicums, 2 extension-correspondence technicums, and 175 extension-correspondence divisions, with a total of 125,000 students, among whom 29,000, or 23 percent, were extension-correspondence students.[80] In the U.S.S.R. at large the 1959 estimated enrollment in agricultural technicums was 300,000. In 1956 the distribution of agricultural students in Soviet technicums by specialty field was as indicated in table III-10.

TABLE III–10.—*Distribution of agricultural technicum students, by specialty field, in 1956*

Specialty code	Specialty field	Regular full-time day enrollment	
		Thousands	Percent
1508.....	Mechanization and electrification of agriculture.....	71.8	26.3
1501.....	Agronomy.....	59.5	21.8
1504.....	Animal breeding (zootechnics).	47.6	17.6
1506.....	Veterinary specialties.....	26.1	9.6
(Remaining 1500's)...	All other agricultural fields...	67.3	24.7
	Total.....	272.3	100.0

Source: K. A. Ivanovich, *Sel'skokhoziaistvennoe obrazovanie v SSSR* (Agricultural Education in the USSR), Moscow, 1958, p. 187.

The training of agricultural technicians in these fields used to last 4 years (202 weeks of instruction), but it is now being increased to 4 years and 4 months to comply with the employment experience requirement. The curriculum in agronomy (Specialty 1501) is presented in appendix table III–B–4, and from the data presented there the structure of the agricultural instruction program can be ascertained as follows:

[80] *Ibid.*, No. 2, 1960, p. 2.

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TABLE III–11.—*General structure of technicum curriculum in agriculture, 1956 (4-year program)*

Subject group	Instruction hours	Percent of total
I. General (mostly academic) subjects	1,748	31.1
A. General (language, history; including physical education)	(938)	(16.6)
B. Sciences (mathematics, physics, chemistry)	(810)	(14.5)
II. Agricultural (general and specialized subjects)	2,032	36.2
III. Applied subjects and field practice	1,840	32.7
Total	5,620	100.0

Source and Notes: Appendix table III–B–4. Physical culture and military training (198 instruction hours) were assigned to general academic subjects; safety and first aid (48 instruction hours), to general agricultural subjects.

This breakdown of the instruction program reveals that of the total number of instruction hours (5,620), general studies accounted for over 31 percent, which is about the same proportion of time as that allocated in other programs indicated above. General and narrowly specialized theoretical subjects were allotted 36 percent of the instruction time, and the remaining one-third was spent in applied subjects and field practice. Again we observe a remarkable similarity in the structure of this agricultural curriculum with that generally offered in other semiprofessional schools. As in the other programs, applied orientation is prevalent.

Other agricultural technicum students, such as veterinary technicians (called *vetfel'dsher*—there are some 50,000 such persons currently employed in the U.S.S.R.), receive training similar to that for agronomy technicians, with the theoretical and specialized courses obviously oriented toward veterinary medicine. It is extremely difficult to compare Soviet agricultural technicum training with American education in this field, for in the United States, training of a similar type is offered only in vocational agricultural high schools and in some programs of the agricultural schools of state colleges. The latter as a rule provide education on a much higher plane than Soviet agricultural technicums.

5. *Medical Aides and Health Field Semiprofessionals*

Soviet semiprofessional schools in the field of medicine train nurses, midwives, assistant physicians (or simply medics), pharmacists, and also dentists. For many of these occupations a higher education is required in the United States. We do not have, of course, the uniquely Russian occupation of assistant physician (*fel'dsher*—"medic"), who in rural areas of the Soviet Union often performs the work ordinarily done by medical doctors. It must also be emphasized that Soviet dentists receive only a secondary semiprofessional education and, except for oral surgeons, are trained in semiprofessional schools.

A roster of Soviet medical secondary school graduates by narrow specialty fields for 1956 is presented in table III–12.

TABLE III–12.—*Number and composition of Soviet medical semiprofessional school graduates, by specialty field, in 1956*

Specialty field	Number	Percent
Medic—Assistant physicians (*fel'dsher*)	22,343	30.4
Sanitary technicians	2,974	3.9
Medic—Assistant physician midwives	9,953	13.7
Midwives (*akusherki*)	13,771	18.8
Medical nurses	15,891	21.5
Medical laboratory technicians	1,249	1.7
Dentists	879	1.2
Dental technicians	679	0.9
Pharmaceutical aides	4,617	6.3
Entomologists	175	0.2
X-ray technicians	265	0.3
Other (medical industry technicians)	261	0.3
Total	73,075	100.0

Source: Ministerstvo Zdravookhraneniia SSSR (Ministry of Public Health of the U.S.S.R.), *Zdravookhranenie v SSSR* (Public Health in the U.S.S.R.), Moscow, 1957, p. 161.

As is evident from these data, Soviet semiprofessional training in the medical field is concentrated on assistant physicians, midwives, and nurses.

Appendix table III–B–5 presents a curriculum of a Soviet semiprofessional school for assistant physicians, i.e., *fel'dsher*. In the 1940's and early 1950's training of a *fel'dsher* lasted 3 years, and the stress on applied and practical

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pursuits is evident here as in other fields. The curriculum of these secondary medical schools indicates that approximately 34 percent of some 4,500 instruction hours was spent in practice and laboratory work, and 66 percent was devoted to classroom instruction. The allocation of time to various subjects was as follows. About 14 percent of the total time was devoted to general academic subjects (languages, history mathematics); about 26 percent to general medical and biological instruction; 53 percent to specialized clinical and military-medical subjects; and about 7 percent to various tests and final certification examinations. Again, it may be noted that both applied and specialized instruction are dominant, although the former is not so pronounced in this case as in the engineering or agricultural technicum programs.

The curriculum for the training of assistant physicians presented in appendix table III–B–5 was revised in the early 1950's, first upward to 4 years (without substantial change in the specialized course content), and then downward to 1 year and 10 months because since the mid-1950's the semiprofessional medical schools under consideration have been accepting largely 10-year-school graduates. In 1958, among 150,000 students, 63 percent had 10-year education.[81] Nevertheless, the cutback in the curriculum has had the adverse result of cutting down the time devoted not only to academic subjects but to applied training as well. While in other semiprofessional school curricula 34 to 42 percent of total instruction time is reserved for applied training, in medical curricula, where Soviet authorities insist it is needed the most,[82] applied practical training occupies only 26 to 28 percent of the total instruction time. Soviet authorities themselves state that the preparation of assistant physicians and midwives in this program is "very poor," and it is being advocated that the training be lengthened again to 4 or even 5 years.[83] It is hoped that such expansion of the program would "eradicate the present deficiencies of secondary medical education," particularly in regard to its practical clinical aspects.

[81] *Ibid.*, No. 12, 1958, p. 20.
[82] *Ibid.*, p. 21.
[83] *Sovetskoe zdravookhranenie*, No. 5, 1959, p. 7.

6. *Semiprofessional Training for Soviet Teachers*

At the end of 1958 about 500,000 of the 600,000 Soviet primary school teachers had had "pedagogical" education[84] on the semiprofessional level. Soviet semiprofessional schools in the field of education train, in addition to elementary grade teachers, preschool teachers, Pioneer organizers, and various kinds of specialists in cultural service fields.[85] Similarly, as in the case of other semiprofessional schools (see discussion below), the number of secondary semiprofessional schools for teachers has been declining in recent years. The number of these normal schools *(pedagogicheskie uchilishcha)* dropped from 360 in 1956[86] to 304 in January 1959.[87] As evident from graduation figures (see below), this type of training in semiprofessional schools is now being rapidly curtailed in favor of training in higher educational establishments.

Appendix table III–B–6 presents the 1952 curriculum of the Soviet normal school for primary school teachers. It was a 4-year program designed for those who had completed 7 years of the general school and was based on 4,722 instruction hours. About half of these were devoted to sciences, about 20 percent to pedagogical subjects, and about 30 percent to general academic subjects. This curriculum represents a considerable improvement over that used in the 1930's in a 3-year training program for elementary grade teachers and another, also much weaker curriculum, introduced in pedagogical schools in 1942. The 1952 curriculum was in use as late as 1958, except for 2-year pedagogical schools established in 1954 for 10-year-school graduates; in these schools the original 4-year program was cut almost in half by eliminating, again, most of the general academic subjects.

The notable feature of the pedagogical school curriculum is its definite subject-matter orientation; there is much more emphasis on substantive training in literature, mathematics, sciences, etc. than on instruction in pedagogy. In

[84] See appendix table II–D–3 and discussion in ch. II.
[85] See the roster of specialties under the decimal code 2000 in appendix III–B–1.
[86] *Sprav SSU–1956, passim.*
[87] Appendix table III–C–2.

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each of the subjects a rather brief course is given in the instruction methods suitable for elementary school teaching, but the main emphasis of the curriculum is on the subject matter proper. This is the reverse of the common practice in the training of teachers in the United States; and while in the last few years American teachers' colleges have been criticized for their deemphasis of subject matter, criticism is now being voiced in the Soviet Union of the opposite tendency—that not enough pedagogy, teaching methods, and practice teaching assignments are included in the curriculum.

Appendix table III–B–7 presents a 1954 curriculum designed for the training of preschool teachers in semiprofessional pedagogical schools. The total number of instruction hours in the 2-year course is 2,133, and the program is heavily weighted in favor of activity subjects. Also, few subject matter courses in the traditional disciplines (language, literature, mathematics, and sciences), such as are usually found in other phases of Soviet pedagogical education (especially higher education), appear in this curriculum. As it is difficult to distinguish in pedagogical school programs between general and specialized subjects, it is also impossible to define precisely the allocation of instruction time among general and specialized subjects in the present curriculum.

The examples of various semiprofessional school curricula given above in several markedly distinct fields of occupational specialization suggest that up to 60 percent of time is devoted to specialized subjects and practical instruction. In general, it was stipulated in the past that at least 30 to 35 percent of all instruction time in semiprofessional schools be devoted to practice assignments,[88] not including laboratory or teamwork assignments which accompany lecture courses. Except for the case of teacher education on the semiprofessional level, where a clear line of distinction cannot be drawn, this applied orientation has been observed to play a large part in the design of individual curricula.

The current reform of semiprofessional education is aimed at increasing this applied emphasis, and in the future 40 to 50 percent of the total instruction time will be applied or else consist of mandatory employment in the second or third year of study. In terms of subject-matter content in specialized subjects, no reduction in requirements seems to be contemplated. According to the 1959 and 1960 curricula, the number of subjects and the total number of instruction hours devoted to their teaching remain about the same as before. The apparent aim of the recent measures is to strengthen the applied and functional orientation of semiprofessional school programs without seriously undermining the theoretical content of specialized instruction. In addition, it seems to be the intention to upgrade semiprofessional education in general by admitting only 8-year-school graduates—rather than students with a 7-year education as has been the case heretofore—and by continuing to accept secondary school graduates who now have 10, and in the future will have 11, years of education.

7. *Qualitative Factors Affecting Semiprofessional School Instruction Programs*

The quality of training in Soviet semiprofessional schools has been uneven over the past years. In the early 1930's, when accelerated programs were introduced, when there was a general lack of textbooks, facilities, and qualified teachers, the training was probably of very low quality. After the reforms of 1932, a gradual tightening of standards became evident, and by the late 1930's the quality of instruction had improved considerably. Entrants into semiprofessional schools began to be recruited from regular schools; traditional grading was put into effect; standard textbooks (however inadequate) began to appear in quantity; instructors and teachers were able to grade students more according to their ability than according to their proletarian origin, Communist Party or Komsomol affiliation. Despite these improvements in the 1940's and 1950's, many problems affecting the quality of semiprofessional instruction remain.

It must be emphasized that it is very difficult to judge the quality of instruction programs in Soviet semiprofessional schools since only a few syllabi are available for analysis. Soviet sources indicate that there is a lack of stability and

[88] MVO SSSR, Movshovich, *op. cit.*, p. 5.

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uniformity in semiprofessional school curricula and that there is wide variation in individual course syllabi. It is not known to what extent individual semiprofessional schools conform to the centrally prescribed curricular structure or deviate from it to suit local conditions. It is certain, however, that the Ministry of Higher and Secondary Specialized Education subjects semiprofessional establishments to less scrutiny than institutions of higher learning.

From what is known about programs, it appears that in the field of general academic subjects, the semiprofessional schools have certainly much less to offer than the upper grades of regular secondary schools. The picture is very different in specialized theoretical subjects, however. In mathematics, for instance, it is known that all engineering technicum students are required to master the fundamentals of calculus and analytical geometry, which is more than Soviet regular secondary school students, or most students in American vocational technical institutes, are required to learn. In the field of engineering mechanics, courses on the strength of materials and the elements of theoretical mechanics with a rather extensive use of calculus are included. In courses for electrical engineering technicians, instruction in the use of complex number and hyperbolic functions is required. In addition to general inorganic chemistry, the elements of analytical chemistry are taught. There are, moreover, specialized courses that offer in meticulous technical detail instruction in different technological processes and in the operation, standards, and design of various types of equipment.

While instruction in some basic sciences and technical subjects is thorough, the question arises to what extent the knowledge gained is utilized in applied fields. In discussing semiprofessional education, Soviet sources have singled out on a number of occasions two aspects of this training: what a person *must know (dolzhen znat')* in theory and what a graduate *must be able to do (dolzhen umet')* in terms of manual skill.[89] This juxtaposition of knowledge and skill prowess reflects the problems of a system of technical education. The complaint is made that applied instruction is not well correlated with the acquisition of theoretical knowledge. Dexterity in a skill may constitute a more important end result of semiprofessional education. The recipe for what the student should "know" and should "be able to do" is a manifestation of the two objectives of semiprofessional education: (1) Acquisition of general and specialized subjects of instruction, which drills into the student's mind the required "theoretical" knowledge; and (2) the applied pursuits—acquisition of a workman's skill, which consists of industrial workshop activity and practice work assignment in industry (which will now be expanded because of the addition of the employment requirement).

The formalistic approach to theoretical instruction adds a further element of doubt as to the effectiveness of the instruction program. Subjects are taught in the grade-school manner and are based on the classroom lesson unit *(urok)*. "The lesson is the main form of the instruction process in a technicum."[90] This dictum is implemented by the standard sequence: check the homework assignment, explain the new material, repeat, ask questions to see if the students understand the lesson, give the homework assignment. Such procedure is followed in all fields and all theoretical subjects and is acclaimed as the most efficient instruction approach.[91] As a result, the question of how to make students study independently and show some spontaneity and originality is a continuous problem.[92]

Soviet sources often complain further that semiprofessional school students are overburdened by the number of courses and by the quantity of material assigned for study, and it is said that student failures are frequently attributable to the fact that so much material is given that the students cannot master it thoroughly. This overburdening is related in part to the periodic checking on the student's performance, with about 35 to 40 term and final examinations. The students are said to be under extreme pressure to study for these examinations. It is claimed, however, that the new semiprofessional school programs will re-

[89] *SSO*, No. 7, 1959, p. 59.

[90] K. A. Ivanovich, *Sel'skokhoziaistvennoe obrazovanie v SSSR* (Agricultural Education in the U.S.S.R.), Moscow, 1958, p. 197.

[91] It is being continuously debated how to structure a "lesson-unit." See among other items, *SSO*, No. 1, 1959, pp. 22–23; No. 12, 1959, pp. 5–6.

[92] *SSO*, No. 11, 1959, pp. 12–14.

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duce the number of final examinations to 15 or 20.[93]

There are various reports about laxity in grading. One concerns a technicum in Central Asia, where "very poor" grades (i.e., numeral 1 in the Soviet grading system) automatically become "passing" (i.e., grade 3) by the "force of inertia," which requires students to be promoted from one year to the next.[94] There are many other reports along these same lines.[95]

There is a further consideration in discussing the quality of semiprofessional instruction. Many technicums require a "diploma project." This requirement is an obvious imitation of the thesis required in higher education. In semiprofessional schools 8 to 9 weeks are set aside for preparation of the diploma project at the end of the 2- or 4-year course. Students in engineering fields, for example, are required to pass a general certification examination as well as to prepare a diploma project dealing with the design, maintenance, or production of a certain type of industrial machinery. Although such a requirement may be viewed as beneficial for maintaining standards, in practice the diploma project is sometimes more of a formality than a serious undertaking.

One Soviet source reports that 70 to 80 percent of the diploma projects are rated "good" or "excellent" even though they are really "illiterate in a technical sense."[96] Various proposals have been made to have outside reviewers *(retsenzenty)*, such as engineers from plants or research institutes, instead of the school instructors, grade these diploma projects. Of course not all the grades are unjustifiably high, but even those projects which are genuinely worthwhile are seldom suitable for application in the industry for whose benefit the students prepare them. "It would be nice to use at least some, if not all"[97] is a remark made by industrial management in regard to the practical merit of diploma projects.

Still another area of complaint about Soviet semiprofessional education is the quality of textbooks. Textbooks specifically prepared for technicum instruction are often lacking; as a result, the textbooks used in general academic and science subjects[98] are often the much too simple books designed for general education schools. On the other hand, the textbooks resorted to in technical subjects are merely abridged versions of the books used in higher educational establishments; sometimes they are indeed the same textbooks.[99] According to Soviet estimates, all technicum programs require about 1,600 different texts, of which only 75 percent are available,[1] including substitutes from secondary schools and higher education.

The geographic location of semiprofessional schools is another problem. Many technicums, especially those in the fields of engineering and technology, are located in cities and industrial centers where a particular industry is prominent. Hundreds of examples indicate[2] that industrial centers with large machine-building plants have technicums for mechanical engineering of various specializations; mining centers have technicums for mining technologists or engineers; cities with large chemical plants have chemical technology technicums, etc. This pattern of location of semiprofessional schools suggests that industrial practice is probably carried out at the nearby plants. In fact, much of a given technicum's instruction program is related to the appropriate manufacturing plant's activity. The industrial complex provides the technicum with an essential base for carrying out applied instruction, and in return a technicum trains substantial numbers of intermediate level specialists and skilled workers for future use in the same industrial complex. This localization of specialized training on the secondary level appears to be more marked than in the case of higher education. The transfer of jurisdiction over semiprofessional schools to the regional councils of the national economy

[93] *Ibid.*, No. 5, 1959, p. 45; No. 7, 1959, p. 61.
[94] *Sovetskaia Kirgiziia*, Sept. 12, 1958.
[95] I.e., *SSO*, No. 4, 1958, pp. 32–33.
[96] *Ibid.*, No. 8, 1959, pp. 13–18.
[97] *Vestnik elektropromyshlennosti*, No. 8, 1957, p. 39. The article discusses a technicum attached to one of the Soviet Union's largest electrical machinery plants in Khar'kov, called *KhEMZ*.

[98] For example, the basic physics text used in an electronics technicum is that by I. I. Sokolov, which is the same one used in the upper grades of the secondary school.
[99] For example, the texts on foundations of radio engineering, design of radio equipment, strength of materials and other subjects listed in the syllabi of an electronics technicum are identical to those used in higher education.
[1] *SSO*, No. 9, 1959, p. 5.
[2] *Sprav SSU–1959* and for other years.

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in the late 1950's will probably further intensify the orientation of their training to suit the local conditions of demand for semiprofessional manpower.

Such close local alliances between semiprofessional schools and industry are bound to have an effect upon the kind and quality of instruction. Technicums affiliated with a modern industrial plant may well have an excellent applied instruction program; others, without such affiliation, may be more backward. Since some technicum graduates are assigned to jobs in other localities, they thus aid in spreading advanced technological know-how (or backwardness, as the case may be). In some respects, this process resembles the much more informal American system of training technicians by industrial corporations in their large plants. The difficulty of the Soviet approach is that the plants are not selected for their modern technical facilities, but rather for their convenience—accessibility to the technicum. This may be a weakness, for in industrially backward areas where the pool of untrained manpower is large, technicum educational opportunities of reasonably high quality cannot be offered. There are hardly any engineering technicums in Soviet provincial towns. The only semiprofessional schools found there are agricultural, medical, or pedagogical schools which satisfy local requirements primarily.

A byproduct of the localization pattern described above is the concentration of technicum textbook writing in two cities—Moscow and Leningrad. In 1954–55, for example, 80 percent of all technicum texts were written by instructors who taught in technicums located in these two cities.[3] The complaint is made that local variations and local requirements for texts, including those written in languages other than Russian, are thus ignored.

Finally, there is the question of teaching staffs and their teaching load. Technicum teachers are frequently recruited, sometimes on a part-time basis, from large industrial plants—as a result, again, of the interdependence between the schools and industry. Occasionally these teachers are retrained through extension-correspondence programs in higher educational establishments,[4] or else they take special courses set up locally. The proportion of multiple jobholders among semiprofessional school teachers is variously reported as 20 to 30 percent. In other words, 70 percent or so of semiprofessional school instructional staffs (estimated at about 200,000 persons) have one teaching job; the remainder work elsewhere concurrently.

Soviet sources report the annual teaching load for semiprofessional school instructors as 1,600 to 1,800 instruction hours—a load now "being cut down to 1,200."[5] If we assume that the total annual load is 1,500 instruction hours during a 38-week academic year, then semiprofessional school instructors have an average weekly load of 40 instruction hours. Under such a heavy schedule, little time can be left for outside preparation, improvement courses or research. Semiprofessional school teachers are more burdened with instructional tasks than higher education staffs and even teachers in regular primary and secondary schools.

Quantitative Trends in Soviet Semiprofessional Education

The quantitative trends in Soviet semiprofessional training parallel to a great extent those which have prevailed in Soviet higher education during the last three decades. Just as in higher education, however, Soviet figures for semiprofessional school enrollments, admissions, and graduations since 1940 have been inflated by the inclusion of part-time students in evening and extension-correspondence programs. Because of the more applied orientation of semiprofessional instruction, evening enrollments have been until recently more significant in semiprofessional schools than in higher education. On the other hand, extension-correspondence enrollments in semiprofessional schools have been and continue to be more limited than in higher educational institutions.

From the point of view of orientation, three

[3] *SSO*, No. 2, 1956, p. 60.

[4] *Ibid.*, No. 6, 1959, p. 61. This source reveals an extensive program for retraining technicum teachers at Divisions for the Improvement of Qualification of Engineers (*Fakul'tety usovershenstvovaniia inzhenerov*) at a number of all-union extension correspondence institutes.

[5] *SSO*, No. 3, 1958, p. 6.

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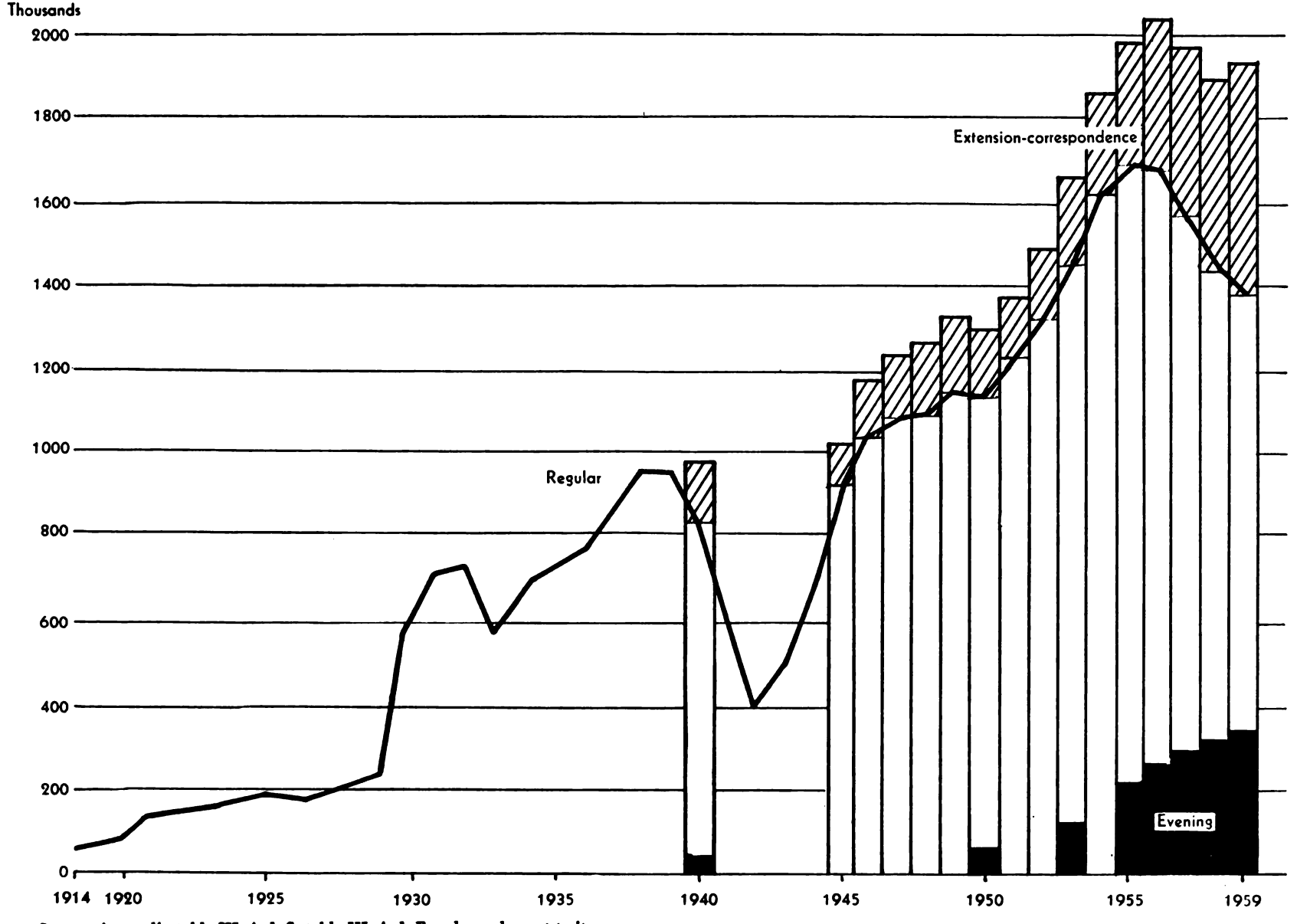
CHART VII.—AGGREGATE ENROLLMENT IN SOVIET SECONDARY SEMIPROFESSIONAL SCHOOLS, 1915, 1920–59



Source: Appendix table III–A–1–S; table III–A–1–E and supplement to it.

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historical phases of semiprofessional training by field are distinguishable. Throughout the 1930's the emphasis was on production-oriented education (engineering, industrial, and agricultural fields). From the late 1930's through the early 1950's, social service fields (health and education) were predominant. Since the mid-1950's, renewed stress has been placed upon technological specialties for industry and agriculture.

1. *Total Enrollment in Soviet Semiprofessional Schools*

Appendix tables III–A–1–S and III–A–1–E present data on annual enrollments in Soviet semiprofessional schools in the fall of each academic year. Chart VII shows the changing enrollment over the last four decades. During the period 1928–58 enrollment in semiprofessional schools increased about ninefold, but the expansion was markedly uneven.

During the 1920's semiprofessional school enrollment did not show any appreciable growth. A spectacular—though artificial—rise took place between 1929 and 1931, when the enrollment rose from about 238,000 to about 707,000. One year later the peak was reached with about 725,000 students, only to be followed by a sharp drop in 1933 to about 590,000 students.

This pronounced upswing and decline occurred because of the training policies prevailing at that time. The Soviet Government, feeling an urgent need for specialists, erroneously assumed during the First Five-Year Plan that training could be drastically accelerated without impairing its quality. Acting on this assumption, the Government assigned a large number of upper-grade students to semiprofessional schools. In fact, many regular secondary schools were simply converted into secondary specialized schools, and overnight their entire upper-grade contingents became semiprofessional school students. New programs, accelerated in some instances to less than a year, were introduced. But by 1932, when it became apparent that such training was not adequate and that the majority of students failed to graduate (the success rate fell to 30 graduations per 100 acceptances), the expansion of enrollments was terminated. During the next 4 years (1932–35) a more moderate attitude began to prevail, and a fall in enrollments was the result. In this drop the chaotic conditions resulting from forced collectivization and the drastic famine which followed undoubtedly also played a part.

In 1935 the 1932 enrollment level was again reached, and during the following years of general school reforms expansion continued gradually until about 1938. Shortly before the war, enrollment began to decline again and then suffered a sharp setback during the war when, in all probability, it dropped to the pre-1930 level. The postwar recovery was a rapid one, and by 1946 a level of about 1 million, slightly above the prewar peak, was reached. Regular (full-time day) enrollment stabilized then at that level until about 1950. The increase in total enrollment between 1946 and 1950 was due largely to the expansion of evening and extension-correspondence training and the inclusion of these students in the overall figures on enrollment.

The expansion in regular (full-time day and evening) enrollment continued during the early 1950's, and in 1955 the all-time high of 1,674,000 students was reached.[6] The regular enrollment thus just about doubled between 1940 and 1955. Extension-correspondence enrollment increased by about 84 percent during the same period, but it still accounted for only a small proportion (14.5 percent) of all students in 1955.

Even though evening enrollment has continued to grow since 1955 (1955—204,000; 1959—318,000), full-time day enrollment has experienced a substantial drop (1955—1,470,000; 1959—1,067,000).[6a] This downward trend in full-time enrollment closely parallels the fall in upper-grade enrollment in regular secondary schools during the same period (see ch. II). In both cases the decline has been the result of the severe population deficit in the 14–18 year-old age group.

Extension-correspondence programs for semiprofessional training have continued to expand

[6] As in higher education, regular enrollment includes day and evening students. Until the mid-1950's evening enrollment did not account for any appreciable number, but as full-time day enrollment began to fall off, the share of evening students increased to offset this downward trend.

[6a] The 1960 fall enrollment in full-time day programs was 1,090,000, out of an aggregate total of 2,059,000 semiprofessional school students (*SSSR–Tsif–1960*, p. 311).

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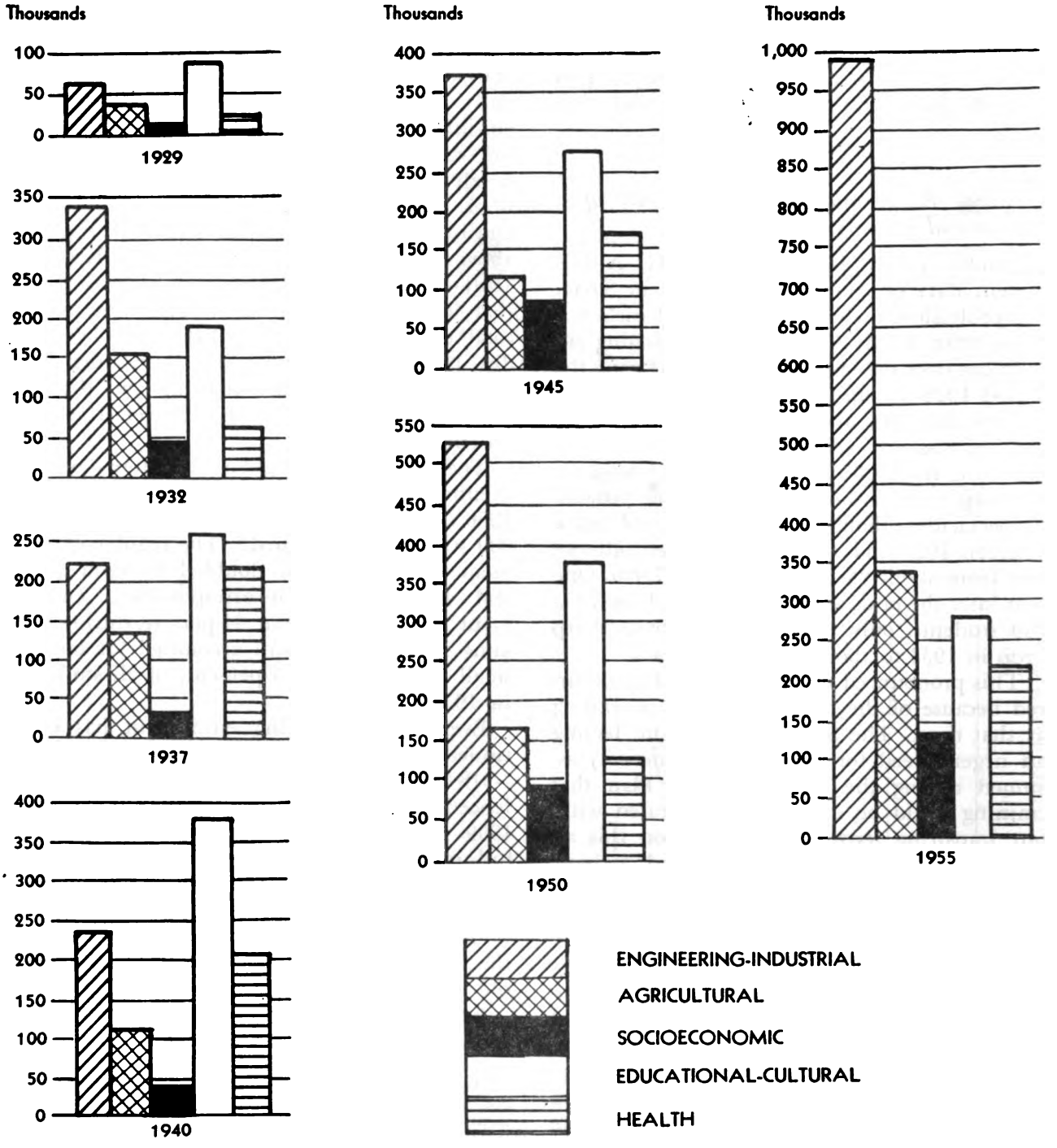
CHART VIII.—ENROLLMENT IN SOVIET SEMIPROFESSIONAL SCHOOLS BY FIELD, 1929–55



Source: Appendix table III–A–1–E.

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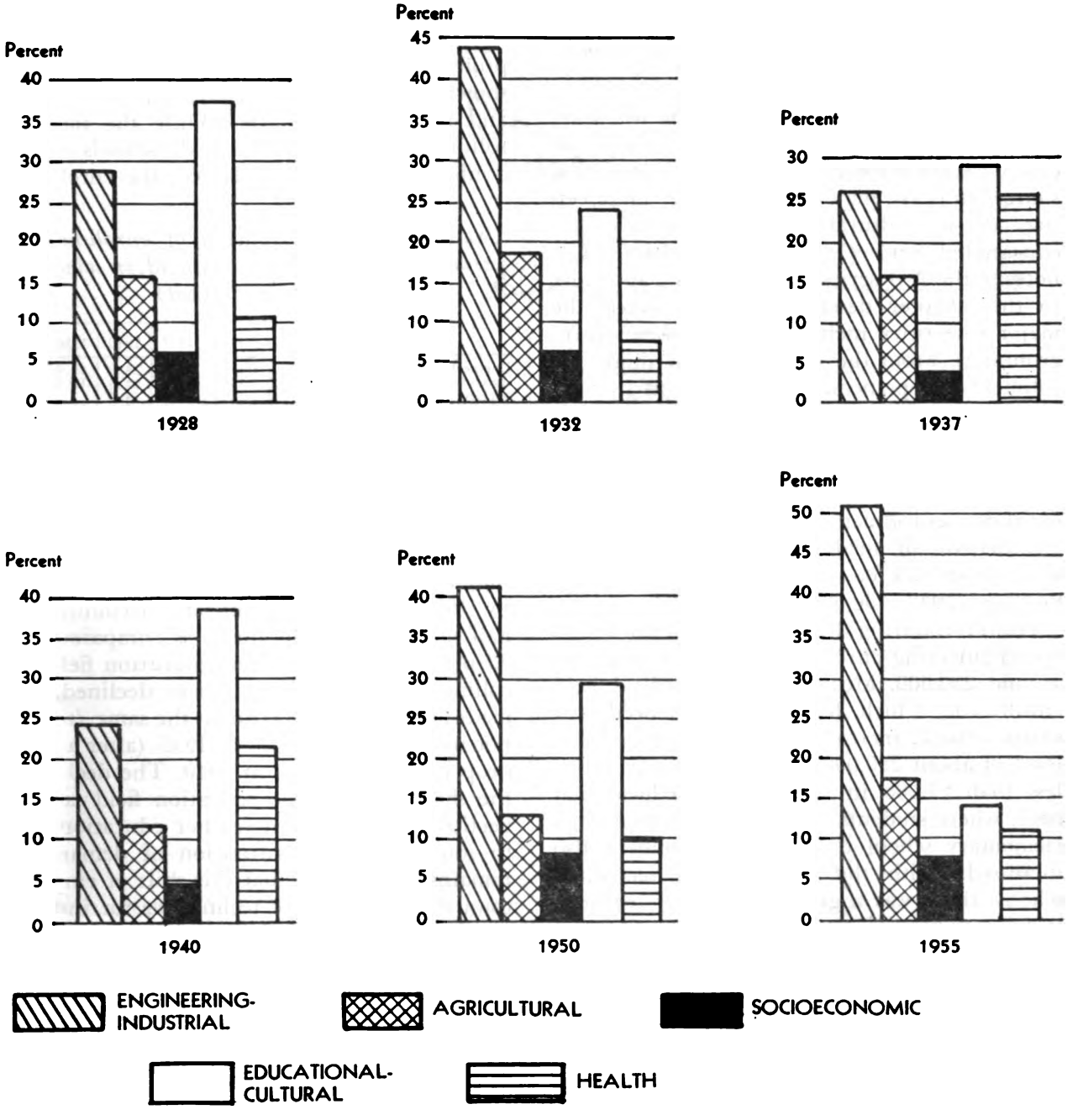
CHART IX.—DISTRIBUTION OF ENROLLMENT IN SOVIET SEMIPROFESSIONAL SCHOOLS BY FIELD, 1928–55



Source: Appendix table III–A–1–E.

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for the last 20 years. In 1958 there were three times as many students (450,000) in these programs as there were in 1940 (155,000). In 1959 there were 523,000 extension-correspondence students in Soviet semiprofessional schools.

2. *Enrollment in Semiprofessional Schools, by Field*

The several hundred specializations for semiprofessionals trained in Soviet secondary specialized schools are grouped by Soviet statistical sources into five major branches: (1) Engineering, (2) agricultural, (3) socioeconomic, (4) educational, and (5) health specialties. The notes to the A–1 series of tables in the appendix to this chapter describe in some detail the major categories included within these broad groupings. From the data presented there, enrollment, acceptances, and graduations by field can be ascertained for various years and periods.

Chart VIII depicts enrollments by field.[7] Enrollment trends for individual fields show extremely erratic behavior. When the artificially expanded enrollment of the early 1930's was terminated, all fields were affected; but the sharpest setback occurred in the field of engineering (1932—350,000; 1937—220,000).

However, during the second half of the 1930's the engineering enrollment tended to stabilize around 230,000. Meanwhile, the medical field enrollment, which had not experienced any sharp setback, increased greatly and reached a level of about 220,000 in 1937, as compared to less than 25,000 in 1929. In the educational field, where students were trained primarily as elementary school teachers, the numbers also increased. With the expansion of secondary schools there was a great shortage of teachers, and expansion of enrollment in this type of training to about 340,000 in 1940 resulted in a numerical domination of this field of specialization over all others. Agricultural enrollment, after a setback in the mid-1930's, expanded during the decade about threefold, reaching the level of about 140,000 in 1940. Finally, the socioeconomic field remained at a point of stagnation (fluctuating between 30,000 and 50,000) and accounted for less than 5 percent of total enrollment in 1940.

[7] For data for other years, see appendix table III–A–1–E.

The postwar period witnessed a complete reversal of the trends noted in the 1930's, and with close to 1 million students enrolled in 1955 in the engineering-industrial field, the training of industrial, construction, transportation, and communications technicians appeared anew as the dominant component of Soviet semiprofessional education. These trends are clearly shown by the data presented in table III–13 and in chart IX above. While the total enrollment in semiprofessional schools barely doubled in 15 years (1940–55), the enrollment in fields training industrial (mostly engineering) technicians increased about fourfold, and by 1955 industrial technicians accounted for half of the total enrollment, as compared with 25 percent in 1940. In the education field, enrollment in absolute numbers declined, and medical enrollment was about the same (though not in percentage terms) in 1955 (after a sharp drop in the 1940's) as in 1940. The decline in the share held by the education field is a reflection of the shift in teacher education and, to some extent, of saturation of demand. It remains to be noted that this shift of emphasis toward the training of technicians for industry and agriculture has been much more pronounced in the semiprofessional schools than in higher education.

TABLE III–13.—*Distribution of enrollment in semiprofessional schools, by field, in selected years (in percent)*

Field	1928	1932	1937	1940	1950	1955
Engineering-industrial	29.1	43.3	25.8	24.9	41.4	50.7
Agriculture	16.3	18.9	15.8	11.8	12.5	17.2
Socioeconomic	6.3	6.2	3.4	4.4	7.2	6.9
Educational-cultural	37.8	24.2	29.5	37.9	29.1	14.2
Health	10.5	7.4	25.5	21.0	9.8	11.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Enrollment (in thousands)	236	797	863	975	1,298	1,960

Source: Appendix table III–A–1–E.

3. *The Growth of Graduating Classes from Soviet Semiprofessional Schools*

Chart X depicts the yearly growth in the number of graduates of Soviet semiprofessional schools.[8] During the last three decades the size of the graduating classes from semiprofessional

[8] See appendix tables III–A–1–S and III–A–1–G.

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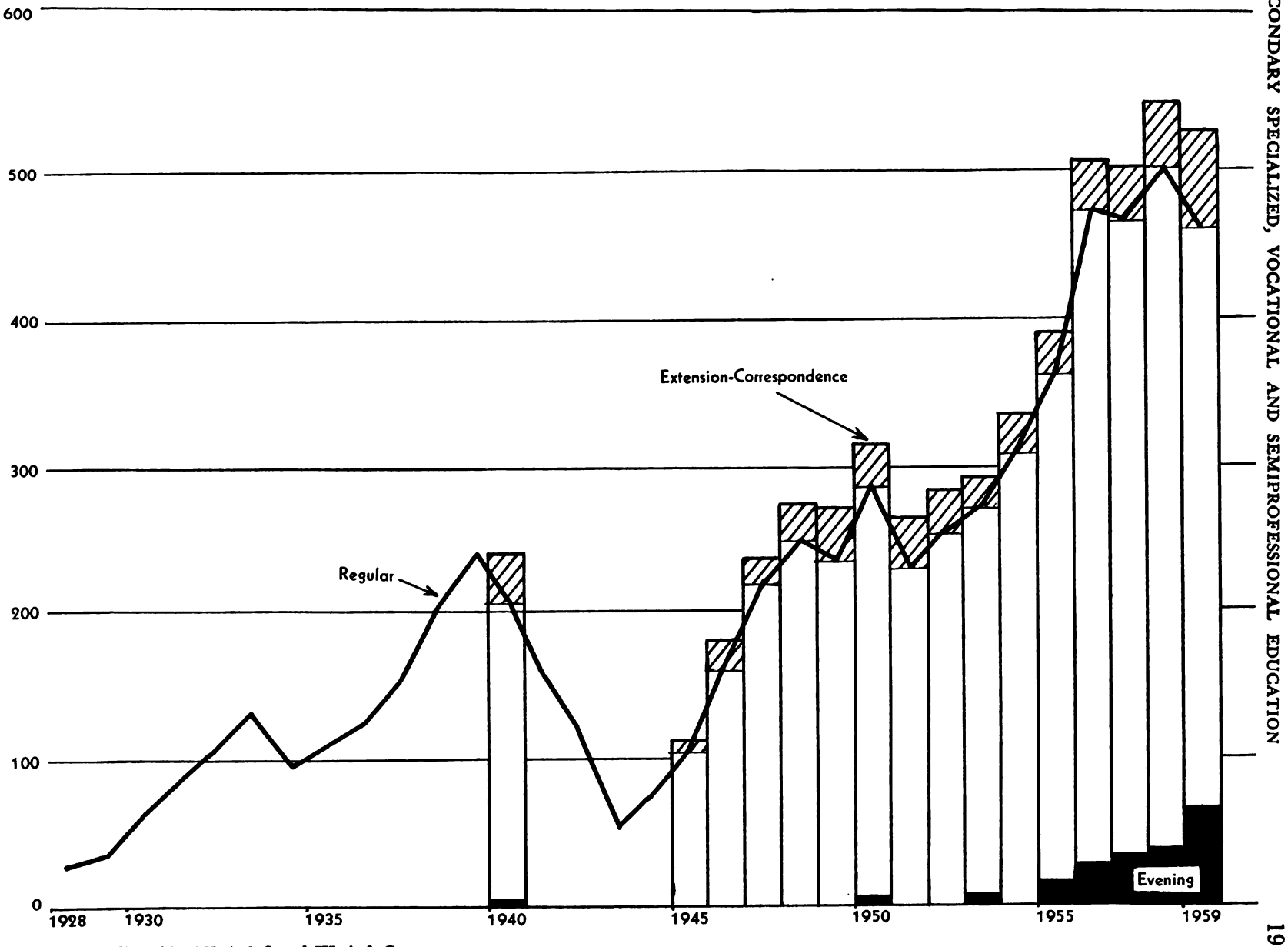
CHART X.—GRADUATIONS FROM SOVIET SECONDARY SEMIPROFESSIONAL SCHOOLS, 1928-59



Sources: Appendix tables III–A–1–S and III–A–1–G.

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schools increased about 18-fold, from about 30,000 in 1928 to about 550,000 in 1958. In 1959 the figure declined slightly to 530,000; and in 1960, even more, to 482,800.[8a] The most rapid growth occurred during the 1930's. From the last prewar year (1940) on, the size of the graduating classes has been inflated by the inclusion of extension-correspondence graduates. Nevertheless, their share among the total has remained remarkably low—10 percent or less. Between 1940 and 1958 the output of regular (day and evening) program graduates increased about 2.5-fold.

The sudden jump in the size of the graduating class between 1955 (361,000) and 1956 (474,000) is to be particularly noted. This was the result of the outpouring of graduates from the accelerated 2-year semiprofessional school programs since 1954. In 1959, though the number of graduates from both evening and extension-correspondence programs increased in comparison with 1958, the increase was not sufficient to offset the drop in the number of graduates from full-time day programs. This latter figure declined continuously in the late 1950's, from 463,000 in 1958, to 390,000 in 1959, to 347,600 in 1960, and is expected to decline further in the early 1960's.

[8a] *SSSR–Tsif–1960*, p. 512.

4. *Semiprofessional School Acceptances and Graduations, by Field*

Trends in acceptances and graduations are of course similar to those in enrollment. Changes in the composition of first-year acceptances antedate the changing composition in graduating classes by 2 to 4 years.

On the basis of the data in appendix tables III–A–1–A and III–A–1–G, the distribution of annual acceptances and graduations for selected years was computed as follows (table III–14).

TABLE III–14.—*Distribution of acceptances in and graduations from Soviet semiprofessional schools, by field, selected years*

Field	Acceptances (percent)				Graduations (percent)			
	1940	1950	1955	1959	1940	1950	1955	1959
Engineering-industrial, total	26.9	40.0	50.1	49.4	12.7	33.2	42.5	50.1
Agricultural	12.6	13.9	16.7	16.9	9.1	15.5	14.9	17.0
Socioeconomic	4.9	8.2	8.8	11.7	3.0	8.0	7.9	9.5
Educational-cultural	33.3	26.6	10.6	11.3	37.0	26.0	20.2	9.9
Health	22.3	11.3	13.8	10.7	38.2	17.3	14.5	13.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total number (in thousands)	382	426	587	656	237	314	388	527

Sources: Appendix tables III–A–1–A and III–A–1–G.

The marked shift of emphasis from social service fields (education and health) to semiprofessional training for the production branches of the economy, particularly industrial technicians, is evident from these data. This trend is most obvious in the composition of the graduating classes in the 1950's. The 1960 decline in the number of semiprofessional graduates was most noticeable among engineering-industrial field technicians, as the following comparisons indicate:[8b]

	1959	*1960*
Engineering–industrial	264,800	225,800
Agricultural	89,500	79,700
Socioeconomic	50,300	56,700
Educational–cultural	52,300	56,400
Health	71,000	64,200
Total	527,900	482,800

Although the absolute number of engineering-industrial technicum graduates declined (by some 40,000), this field still remained the dominant component (46.7 percent) of the 1960 graduating class. The composition of acceptances in 1959 indicates, furthermore, that a similar trend will continue in the early 1960's,

[8b] See appendix table III–A–1–G; *NarKhoz–1960*, p. 750; *SSSR–Tsif–1960*, p. 513.

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and about one-half of all semiprofessionals will be trained as technicians for industry and related branches of the economy.

5. *Composition of Acceptances and Graduations, by Field and Type of Program, in Semiprofessional Schools in 1955*

The latest available data on the detailed composition of entering and graduating classes in Soviet semiprofessional schools are those for 1955. Tables III–15 and III–16 summarize these data by field of study and by type of training program (day, evening, or extension-correspondence).

The 1955 first-year acceptances in semiprofessional schools consisted of 72 percent regular day students, 9 percent evening students, and about 19 percent extension-correspondence students. The majority (93 percent) of the evening division entrants were in programs training industrial technicians. Day and evening division entrants accounted for only about 54 percent of all entrants in the socioeconomic field (trade, accounting, etc.). In other fields three-quarters or more were day and evening students. The largest proportion (44.3 percent) of all extension-correspondence program entrants was accepted in industrial technicums.

The graduating class of 1955 consisted of 89 percent day program graduates, 4 percent evening program graduates, and about 7 percent extension-correspondence program graduates. Industrial technicians accounted for 42 percent of all graduates (388,000). The majority (78 percent) of the evening division graduates were also in the industrial field. Among extension-correspondence graduates, 52 percent were in the education field and 22 percent in the socioeconomic field. (For further details, refer to the tables.)

What is particularly worth noting in these data on acceptances and graduations in Soviet semiprofessional schools is the fact that while about one-half of all extension-correspondence program *graduates* were in the field of education, about one-half of all the students *entering*

TABLE III–15.—*Distribution of acceptances in Soviet semiprofessional schools in 1955*

Specialty branch		Total		Day		Evening		Day and evening		Extension-correspondence	
		Quantity	Percent	Quantity	Percent	Quantity	Percent	Quantity	Percent	Quantity	Percent
Engineering-industrial, total..	thousands.	294.0	50.1	195.1	46.0	50.8	92.7	245.8	51.4	48.2	44.3
	percent...	(100.0)	.....	(66.4)	.....	(17.2)	.....	(83.6)	.....	(16.4)	.....
Industry and construction	thousands.	245.5	41.8	160.7	37.9	48.7	88.8	209.3	43.8	36.2	33.3
	percent...	(100.0)	.....	(65.4)	.....	(19.8)	.....	(85.2)	.....	(14.8)	.....
Transportation and communication	thousands.	48.5	8.3	34.4	8.1	2.1	3.9	36.5	7.6	12.0	11.0
	percent...	(100.0)	.....	(70.8)	.....	(4.5)	.....	(75.3)	.....	(24.7)	.....
Agriculture.....	thousands.	98.2	16.7	81.3	19.2	none	.....	81.3	17.0	16.9	15.5
	percent...	(100.0)	.....	(82.9)	.....	.....	.....	(82.9)	.....	(17.1)	.....
Socioeconomic...	thousands.	51.7	8.8	26.9	6.3	1.1	1.9	28.0	5.8	23.8	21.8
	percent...	(100.0)	.....	(52.0)	.....	(2.0)	.....	(54.0)	.....	(46.0)	.....
Education, total.	thousands.	62.4	10.6	46.7	11.0	0.4	0.8	47.1	9.8	15.2	14.0
	percent...	(100.0)	.....	(74.9)	.....	(0.7)	.....	(75.6)	.....	(24.4)	.....
Education....	thousands.	51.7	8.8	36.0	8.5	0.4	0.7	36.4	7.6	15.2	14.0
	percent...	(100.0)	.....	(69.7)	.....	(0.8)	.....	(70.5)	.....	(29.5)	.....
Arts and cinema.....	thousands.	10.7	1.8	10.7	2.5	negl.	0.1	10.7	2.2	none	.....
	percent...	(100.0)	.....	(99.7)	.....	(0.3)	.....	(100.0)	.....	.....	.....
Health, medicine, and physical culture	thousands.	81.2	13.8	74.0	17.5	2.5	4.6	76.5	16.0	4.8	4.4
	percent...	(100.0)	.....	(91.0)	.....	(3.1)	.....	(94.1)	.....	(5.9)	.....
Total.....	thousands.	587.6	100.0	424.0	100.0	54.8	100.0	478.7	100.0	108.9	100.0
	percent...	(100.0)	.....	(72.1)	.....	(9.3)	.....	(81.4)	.....	(18.6)	.....

Source: *KS–1956*, pp. 236–237.

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TABLE III–16.—*Distribution of graduations from Soviet semiprofessional schools in 1955*

Specialty branch		Total		Day		Evening		Day and evening		Extension-correspondence	
		Quantity	Percent	Quantity	Percent	Quantity	Percent	Quantity	Percent	Quantity	Percent
Engineering-industrial, total.....	thousands.	164.7	42.5	147.4	42.7	12.4	77.6	159.8	44.2	4.9	18.5
	percent...	(100.0)	.....	(89.5)	.....	(7.5)	.....	(97.0)	.....	(3.0)	.....
Industry and construction	thousands.	140.8	36.3	125.4	36.3	12.1	75.9	137.5	38.0	3.3	12.4
	percent...	(100.0)	.....	(89.0)	.....	(8.6)	.....	(97.6)	.....	(2.4)	.....
Transportation and communication	thousands.	23.9	6.2	22.0	6.4	0.3	1.7	22.3	6.2	1.6	6.1
	percent...	(100.0)	.....	(92.0)	.....	(1.1)	.....	(93.1)	.....	(6.9)	.....
Agriculture.....	thousands.	57.8	14.9	55.9	16.2	none	.....	55.9	15.5	1.9	7.0
	percent...	(100.0)	.....	(96.7)	.....	.....	.....	(96.7)	.....	(3.3)	.....
Socioeconomic...	thousands.	30.5	7.9	24.1	7.0	0.5	2.9	24.6	6.8	5.9	22.0
	percent...	(100.0)	.....	(79.2)	.....	(1.5)	.....	(80.7)	.....	(19.3)	.....
Education, total..	thousands.	78.5	20.2	64.0	8.5	0.5	3.0	64.5	17.9	14.0	52.5
	percent...	(100.0)	.....	(81.7)	.....	(0.6)	.....	(82.3)	.....	(17.7)	.....
Education....	thousands.	73.5	19.0	59.0	17.1	0.5	3.0	59.5	16.5	14.0	52.5
	percent...	(100.0)	.....	(80.3)	.....	(0.7)	.....	(81.0)	.....	(19.0)	.....
Arts and cinema.....	thousands.	5.0	1.2	5.0	1.4	none	.....	5.0	1.4	none	.....
	percent...	(100.0)	.....	(100.0)	.....	.....	.....	(100.0)	.....	.....	.....
Health, medicine, and physical culture	thousands.	56.3	14.5	53.7	15.6	2.6	16.5	56.3	15.6	none	.....
	percent...	(100.0)	.....	(95.3)	.....	(4.7)	.....	(100.0)	.....	.....	.....
Total.....	thousands.	387.8	100.0	345.1	100.0	16.0	100.0	361.0	100.0	26.7	100.0
	percent...	(100.0)	.....	(89.0)	.....	(4.1)	.....	(93.1)	.....	(6.9)	.....

Source: *KS–1956*, pp. 238–239.

extension-correspondence programs were in the industrial field. This is clearly a reflection of the growing emphasis on extension-correspondence training in the industrial fields and also the result of differential rates of success in this program in various fields.

6. *Composition of Semiprofessional Graduating Classes in 1955, by Specialty Group and Institutional Grouping*

In preceding sections of this chapter we have dealt with the composition of semiprofessional school enrollment, acceptances, and graduations by field or branch of study based on an *institutional* grouping. Table III–17 below shows the composition of the 1955 graduating class by *specialty group* as well as, for purposes of comparison, by institutional breakdown. It appears from these data that the differences resulting from the two approaches are only minor. It is true that some of the technicians reported in the institutional breakdown as graduates in engineering-industrial and agricultural fields appear actually to have been trained in socioeconomic specialties (such as industrial or agricultural bookkeeping, planning, etc.). Thus about 6,000 engineering technicians and about 7,000 semiprofessionals in the agricultural field indicated in the respective branches under the institutional breakdown appear under socioeconomic field semiprofessionals in the specialty breakdown. For other categories, however, there is a close coincidence between the two sides of table III–17, the differences not exceeding 3 to 5 percent of the respective totals. This is an extremely important statistical result, which implies that institutional breakdowns can be reliably used as a substitute for specialty breakdowns.

7. *Number and Distribution of Engineering Industrial Technicum Graduates by Specialty Field*

Table III–18 presents information about the 1950 and 1955 graduating classes of Soviet technicians in engineering-industrial fields by de-

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TABLE III–17.—*Comparison of the composition of Soviet semiprofessional graduating class of 1955, by specialty field and institutional grouping*

Specialty classification				Institutional classification		
Specialty code	Specialty group	Number	Percent	Percent	Number	Institutional branch
	Engineering-industrial, total	158,780	40.9	42.5	164,719	"Engineering" total.
				36.3	140,799	Industry and construction.
				6.2	23,920	Transportation and communications.
	Mining engineering, total	18,579	4.8			
0100	*a.* Geology and exploration of mineral deposits	5,626	1.5			
0200	*b.* Exploitation of mineral deposits	12,953	3.3			
0400	Metallurgy	4,538	1.2			
	Electrical and power engineering, total	29,343	7.6			
0300	*a.* Power engineering	12,712	3.3			
0600	*b.* Electrical machine building and electrical instrument construction	4,784	1.2			
0700	*c.* Radio engineering and communications	11,847	3.1			
0500	Machine building and instrument construction	34,904	9.0			
1200	Construction	32,367	8.3			
	Chemical and related, total	23,963	6.2			
0800	*a.* Chemical technology engineering	7,203	1.8			
0900	*b.* Timber engineering and technology of wood processing, cellulose and paper manufacturing	5,079	1.3			
1000	*c.* Technology of food products industry	5,737	1.5			
1100	*d.* Technology of consumer goods industry	5,944	1.6			
1600	Transportation	12,605	3.2			
	Other	2,481	.6			
1300	*a.* Geodesy and cartography	1,400	.4			
1400	*b.* Hydrology and meteorology	1,081	.2			
1500	Agriculture and forestry	50,436	13.0	14.9	57,769	Agriculture, total.
	Economics and jurisprudence	42,898	11.1	7.9	30,479	Socioeconomic
1700	*a.* Economics	41,607	10.7			
1800	*b.* Jurisprudence	1,291	.4			
	Educational-cultural, total	74,384	19.2	20.2	78,492	Education total.
2000	*a.* Pedagogy and library	70,187	18.1	19.0	73,541	Education.
2100	*b.* Arts	4,197	1.1	1.2	4,951	Arts.
1900	Medicine, health and physical culture	59,573	15.4	14.5	56,311	Medicine, health and physical culture
	Total	387,770[a]	99.6	100.0	387,770	Total

[a] There is an unexplained residual of 1,709.
Source: *KS–1956*, pp. 239, 241, 242.

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TABLE III–18.—*Number and distribution of industrial technicians graduating from Soviet semiprofessional schools, by specialty group, in 1950 and 1955*

Specialty code	Specialty breakdown	1950		1955		Rate of growth 1950–55
		Number	Percent	Number	Percent	
	"Engineering" technicians, total	98,407	100.0	158,780	100.0	1.60
	Industry and related fields:					
	Technicians for—					
	Mining engineering (primarily), total	7,786	7.9	18,579	11.7	*2.37
0100	*a.* Geology, geological explorations, and surveying of mineral deposits	1,808	1.8	5,626	3.5	*3.11
0200	*b.* Mining operations and exploration of mineral deposits	5,978	6.1	12,953	8.2	*2.17
0400	Metallurgical engineering (primarily)	4,935	5.0	4,538	2.8	0.92
	Electrical and power engineering (primarily), total	15,285	15.5	29,343	18.5	*1.92
0300	*a.* Power (including electrical power)	7,663	7.7	12,712	8.0	*1.66
0600	*b.* Electrical machinery and equipment	2,411	2.5	4,784	3.0	*1.98
0700	*c.* Radio and communications	5,211	5.3	11,847	7.5	*2.27
0500	Mechanical engineering (primarily); machine building and equipment	26,562	27.0	34,904	22.0	1.31
1200	Civil engineering (primarily); "construction"	14,580	14.8	32,367	20.4	*2.22
	Chemical and related (total)	16,741	17.1	23,963	15.1	*2.03
0800	*a.* Chemical technology (proper)	4,428	4.5	7,203	4.6	*1.63
0900	*b.* Wood derivatives, pulp, paper, cellulose, etc	2,427	2.5	5,079	3.2	*2.09
1000	*c.* Food technology and processing	4,911	5.0	5,737	3.6	1.17
1100	*d.* "Consumer industries technology" (leather, textiles, etc.)	4,975	5.1	5,944	3.7	1.19
1600	Transport	11,102	11.3	12,605	7.9	1.14
	Other	1,416	1.4	2,481	1.6	*1.75
1300	*a.* Geodesy and cartography	814	0.8	1,400	0.9	*1.72
1400	*b.* Hydrology and meteorology	602	0.6	1,081	0.7	*1.80

Source: *KS–1956*, p. 241–242.
* Larger than average increase in graduates.

TABLE III–19.—*Summary of graduations from Soviet semiprofessional*

[In thousands

	1928		1st Five-Year Plan, 1929–32			2d Five-Year Plan, 1933–37			3d Five-Year Plan, 1938–40		
	Total	Percent	Total	Per annum	Percent	Total	Per annum	Percent	Total	Per annum	Percent
1. Engineering-industrial, total	6.8	23.9	98.6	24.65	33.8	213.2	42.64	34.2	115.2	38.40	17.0
a. Industry and construction	.....	.....	.....	.....	.....	147.5	29.50	23.7	81.1	27.04	12.0
b. Transportation and communication	.....	.....	.....	.....	.....	65.7	13.14	10.5	34.1	11.36	5.0
2. Agriculture	4.4	15.4	58.0	14.50	19.9	94.0	18.80	15.1	77.5	25.83	11.4
3. Socioeconomic	1.2	4.2	14.5	3.62	5.0	35.7	7.14	5.7	22.4	7.46	3.3
4. Educational-cultural, total	11.3	39.6	82.5	20.62	28.4	179.5	35.90	28.9	213.6	71.20	31.5
a. Education	.....	.....	.....	.....	.....	.....	.....	.....	205.8	68.60	30.3
b. Arts	.....	.....	.....	.....	.....	.....	.....	.....	7.8	2.60	1.2
5. Health-medical	4.8	16.9	37.6	9.40	12.9	100.2	20.04	16.1	249.4	83.13	36.8
Grand total T	28.6	100.0	291.2	72.80	100.0	623.0	124.60	100.0	678.2	226.06	100.0
R	28.6	100.0	291.2	72.80	100.0	623.0	124.60	100.0	649.1	216.36	95.7
E	n	.....	n	n	.....	n	n	.....	29.1	9.70	4.3

Sources: Appendix table III–A–1–G. 1960–65 projection from appendix table VI–B–4–SP.

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tailed specialty group. The different rates of growth of the various disciplines during the 1950–55 period indicate that several specialty fields were heavily emphasized to the disadvantage of others. Particularly noticeable is the emphasis on training technicians for the extracting (mining), chemical, and electrical industries.

8. *Summary Trend of Semiprofessional Graduations, by Field and Period*

Table III–19 summarizes the data on graduations from Soviet semiprofessional schools by field for various periods, with computed average annual rates of output of specialists and distributions in percent. The data are depicted graphically in chart XI.

Once again, the table reveals the decline since the late 1930's of the educational and health fields in Soviet semiprofessional education and the rapid rise in importance, particularly since 1950, of engineering-industrial training. In the current period (1956–59) engineering technicums have produced graduates at the rate of 235,000 per year, a 35-fold increase since 1928. Otherwise, there is little need to comment further upon the 1928–59 figures, save perhaps to note that for the period 1938–59 they include extension-correspondence graduates.

The projection for the next few years indicates that the current trend emphasizing the training of industrial technicians will continue and that the annual flow of graduates in educational-cultural and health-medical fields will decline further.

Table III–20 presents a summary of the total number of Soviet semiprofessional graduates and their distribution, by field.

TABLE III–20.—*Summary of graduations from Soviet semiprofessional schools, 1928-59*

	Graduates 1928–59 (thousands)	Distribution in percent
Engineering-industrial technicians, total	2,450.3	34.5
Agricultural	1,053.8	14.9
Socioeconomic	521.8	7.4
Educational-cultural	1,662.7	23.5
Health-medical	1,395.4	19.7
Total	7,084.0	100.0
Regular	6,599.3	93.2
Extension-correspondence	484.7	6.8

Source: Table III–19.

The table clearly reveals that throughout the 1928–59 period the main effort of the Soviet semiprofessional schools was concentrated on the training of industrial technicians (35 percent of all graduates). This category was followed by semiprofessionals in the educational-cultural field (24 percent) and the health-medical fields (20 percent).

Extension-correspondence graduates of semiprofessional schools accounted for some 7 percent of the total number of graduates, which is

establishments, by field and period, 1928–59 and 1960–65 projection
and percent]

War years, 1941–45			4th Five-Year Plan, 1946–50			5th Five-Year Plan, 1951–55			6th Five-Year Plan, 1956–59			1928–55	1928–59		1960–65 projection		
Total	Per annum	Per-cent	Total	Per annum	Per-cent	Total	Per annum	Per-cent	Total	Per annum	Per-cent	Total	Total	Per-cent	Total	Per annum	Per-cent
81.3	16.26	15.1	391.4	78.28	30.6	602.3	120.46	38.6	941.5	235.38	45.2	1,508.8	2,450.3	34.5	1,440	240	49.5
62.8	12.56	11.6	317.9	63.58	24.9	509.4	101.98	32.7	.....	.....	.....	.....	.....	.....	.....	.....	.....
18.5	3.70	3.5	73.5	14.70	5.7	92.4	18.48	5.9	.....	.....	.....	.....	.....	.....	.....	.....	.....
64.2	12.84	11.9	188.2	37.64	14.7	220.2	44.04	14.1	346.9	86.72	16.6	706.9	1,053.8	14.9	540	90	18.6
29.6	5.92	5.5	108.4	21.68	8.5	130.3	26.06	8.4	179.7	44.92	8.6	342.1	521.8	7.4	360	60	12.4
179.8	35.96	33.3	316.9	63.38	24.8	377.8	75.56	24.2	301.2	75.30	14.4	1,361.5	1,662.7	23.5	240	40	8.2
174.4	34.88	32.3	301.6	60.32	23.6	353.9	70.78	22.7	.....	.....	.....	.....	.....	.....	.....	.....	.....
5.4	1.08	1.0	15.3	3.06	1.2	23.9	4.78	1.5	.....	.....	.....	.....	.....	.....	.....	.....	.....
184.9	36.98	34.2	273.6	54.72	21.4	228.9	45.78	14.7	316.0	79.00	15.2	1,079.4	1,395.4	19.7	330	55	11.3
539.8	107.96	100.0	1,278.5	255.70	100.0	1,559.5	311.90	100.0	2,085.3	521.32	100.0	4,998.7	7,084.0	100.0	2,910	485	100.0
506.8	101.36	93.9	1,156.5	231.30	90.5	1,435.5	287.10	92.0	1,908.6	477.15	91.5	4,690.7	6,599.3	93.2	.....	.....	.....
33.0	6.60	6.1	122.0	24.40	9.5	124.0	24.80	8.0	176.7	44.17	8.5	308.4	484.7	6.8	.....	.....	.....

T—Total. R—Regular. E—Extension-correspondence.

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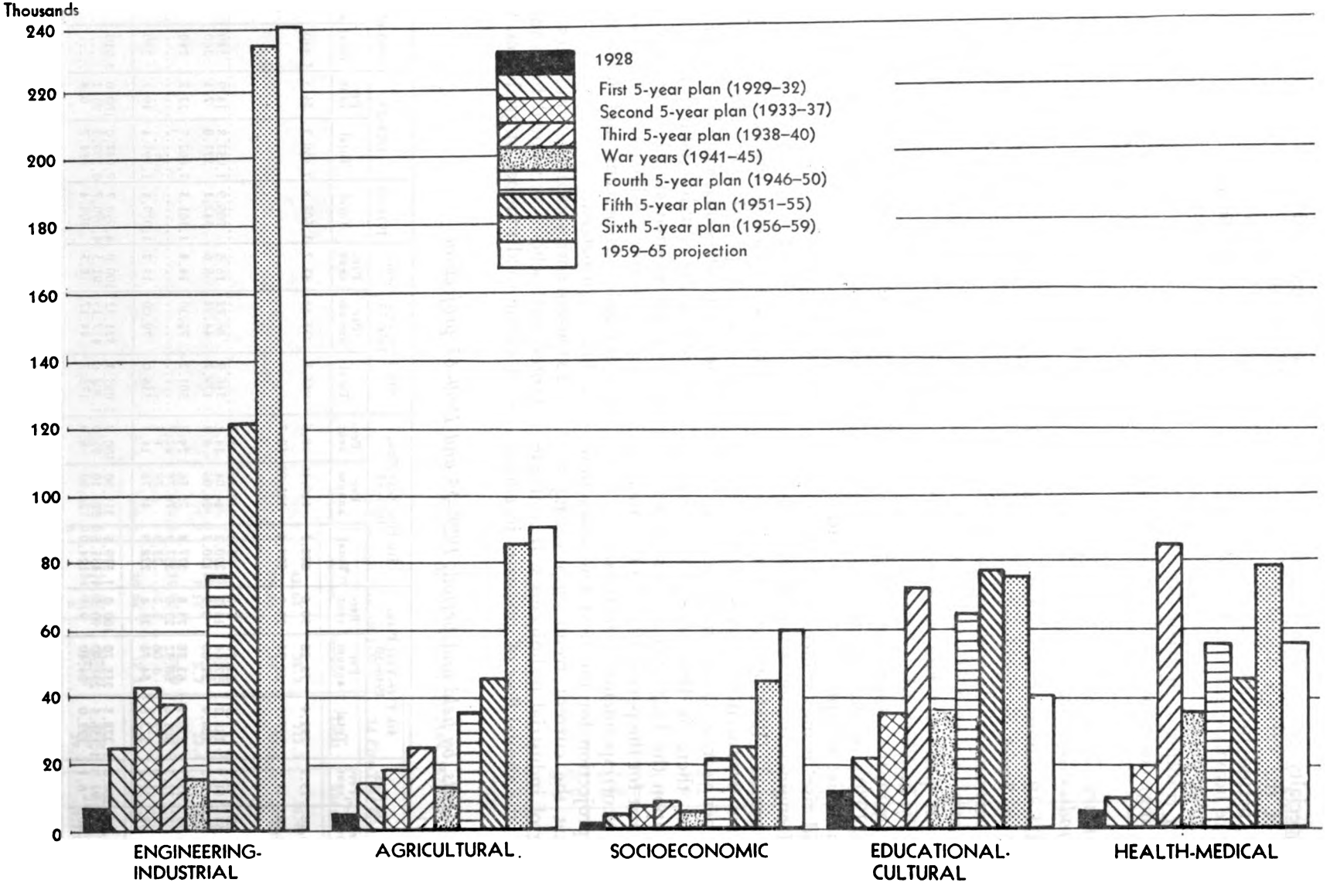
CHART XI.—AVERAGE ANNUAL NUMBER OF SOVIET SEMIPROFESSIONAL GRADUATES IN SPECIALTY FIELDS BY PERIOD, 1928–59, AND 1959–65 PROJECTION



Sources: Appendix tables III–A–1–G and VI–B–4–SP.

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a proportion substantially smaller than the flow of extension-correspondence graduates from Soviet higher educational establishments (17 percent of all higher education graduates for the same period).

During the period 1928-58 Soviet semiprofessional schools graduated a total of 6,564,000 specialists. According to official figures, 288,000 technicians and other semiprofessional personnel were employed in 1928 in the national economy of the U.S.S.R.; by January 1, 1959, this figure had risen to 4,449,000.[9] Thus during the period 1928-58 the total attrition (losses and withdrawals) of semiprofessionals was about 2,403,000, or 36.8 percent of all semiprofessionals graduated during this 30-year period. This high attrition rate is undoubtedly attributable in part to the further education of semiprofessionals in higher education. It is an attrition rate substantially higher than the corresponding 25-percent rate for professionals with completed higher education.

9. *Success Rate of Students in Semiprofessional Schools*

On the basis of the available data on semiprofessional school acceptances and graduations, we can estimate the annual rates of success of students.[10] In the early 1930's success rates (or graduation rates) were quite low, and there were less than 30 graduations per 100 acceptances. These were the classes which had been recruited haphazardly with little regard for properly qualified candidates. In the late 1930's the success rate in engineering fields was about 40 to 45 graduations per 100 acceptances, and in other fields, 50 to 55 graduations per 100 acceptances.

In the postwar period less refined data suggest that the success rate of semiprofessional students for all fields combined was about 65 percent.

Table III–21 summarizes the computed postwar graduation rates by year and period. It has been assumed, in computing the data, that the mean length of semiprofessional training is 3 years. It is of particular interest to note the sharp decline of the graduation rate for the class

[9] *NKh—1956*, p. 193; *NarKhoz—1959*, p. 673. See further discussion in chs. IV and VI.

[10] The success rate is the number in the graduating class as compared with the number in the entering class two or four years earlier. It can be computed directly as admissions: graduations 2 or 4 years hence. In the 1930's Soviet authorities used to publish the rate of withdrawal also, which does not account for failures at graduation or expulsions for unsatisfactory performance. In 1938 the withdrawal rate was 9 to 13 percent, depending upon field and length of training program. This produces a hypothetical rate of success of about 55 to 65 graduations per 100 acceptances, and accounts for withdrawals by those who left "voluntarily" because of personal circumstances or unsatisfactory records. Such information is not found in the postwar statistical handbooks.

TABLE III–21.—*Graduation rates of students from Soviet semiprofessional schools, by year and period*

	Acceptances (thousands)			Assumed graduations (thousands)				Graduation rates (percent)		
	Total	Regular	Extension-correspondence		Total	Regular	Extension-correspondence	Total	Regular	Extension-correspondence
Year:				Year:						
1945...	387.6	352.1	35.5	1948.....	277.3	252.2	25.1	71.5	71.6	70.7
1946...	433.8	394.2	39.6	1949.....	269.4	237.2	32.2	62.1	60.1	81.3
1947...	423.3	379.4	43.9	1950.....	313.7	283.7	30.0	74.1	74.8	68.3
1948...	430.9	359.6	71.3	1951.....	263.2	235.1	28.1	61.0	65.4	39.4
1949...	430.0	364.5	65.5	1952.....	280.6	256.0	24.6	65.2	70.2	37.5
1950...	426.3	365.1	61.2	1953.....	295.5	273.5	22.0	69.3	74.9	35.9
1951...	458.4	406.3	52.1	1954.....	332.3	310.2	22.1	72.5	76.3	42.4
1952...	500.0	440.1	59.9	1955.....	387.8	361.1	26.7	77.6	82.0	44.6
Periods:				Periods:						
1946–48	1,288.0	1,133.2	154.8	1948–50...	860.4	773.1	87.3	66.8	68.2	56.4
1947–49	1,284.2	1,103.5	180.7	1949–51...	846.3	756.0	90.3	65.9	68.5	50.0
1948–50	1,287.2	1,089.2	198.0	1950–52...	857.5	774.8	82.7	66.6	71.1	41.7
1949–51	1,314.7	1,135.9	178.8	1951–53...	839.3	764.6	74.7	63.8	67.3	41.8
1950–52	1,384.7	1,211.5	173.2	1952–54...	908.4	839.7	68.7	65.6	69.1	39.7
1951–53	1,516.4	1,332.4	184.0	1953–55...	1,015.6	944.8	70.8	67.0	70.9	38.5

Source: *KS—1956*, pp. 201–204.

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of 1951 and the trough of slowly rising graduation rates for the 2 years thereafter. In order to eliminate in this instance a possible statistical discrepancy resulting from the somewhat arbitrary postulation of a 3-year mean length of study, the rates by overlapping periods (see lower part of table III–21) were computed. These show a somewhat "smoother" pattern, but they still show a decline for the years 1951-53. The plausible explanation of this drop in graduation rates must probably be sought in external causes, namely the military draft calls in 1950-51, which doubtless put a dent in the enrollment in Soviet semiprofessional schools, particularly in the upper years of study where the 18- and 19-year-olds are concentrated.

Whatever the cause of the fluctuation in the graduation rates may be in individual years and periods, the data show that in recent years some 70 percent of semiprofessional school entrants in regular programs succeed in graduating and about 40 percent of those in extension-correspondence programs complete their training.

10. *Relation of Semiprofessional Training to Higher Education*

Ever since the planning of specialized training was started in the U.S.S.R.,[11] nearly every major governmental pronouncement and major study concerning specialized manpower has referred to an ideal proportion of higher education graduates to semiprofessional graduates as 1 professional to 2 or 3 semiprofessionals, depending upon the specialty field. Why such ratios are promulgated by the Soviet planning authorities would require very extensive analysis into job classifications and job description procedures. It would be important to determine how efficient or rational tables of organization and job requirements are under Soviet conditions as compared with other economies, such as in Western Europe or the United States. The fact is, however, that during the entire period of industrialization, Soviet planners sought what they considered an optimum proportionality between the number of professionals and semiprofessionals which for the most part has not been attained.

Table III–22 shows what this ratio of graduates has actually been during various planning periods. Except for two brief periods (1938-40 and 1946-50), the desired proportion between the number of Soviet specialists on the two levels was not met. The ratios between professional and semiprofessional graduates, particularly for the Five-Year Plan era, show why Soviet planners worry about restoring the "proportionality." In layman's terms, the drive to restore "proportionality" is simply an expression of the fact that more people than the planners want are trying (and during the last few years succeeded) to get higher education; meanwhile schools training semiprofessionals were not producing the desired flow of supporting personnel. As a result, an official campaign has been intensified again to expand semiprofessional training.[12] However, as both the projection and the anticipated figures suggest, during the current Seven-Year Plan the proportionality of semiprofessional to professional graduates will be lower than in most previous plan periods. Whether this is a reflection of changing conditions of employment of both professionals and semiprofessionals in the Soviet economy, as anticipated by the planners, is again difficult to judge without meticulous inquiry into Soviet job classification methods.

TABLE III–22.—*Numbers of and ratios between semiprofessional and professional graduates in the U.S.S.R., 1928–59 and 1959–65 projection*

Period	Number of semiprofessional graduates from technicums and other secondary specialized schools (thousands)	Number of professional graduates from higher educational establishments (thousands)	Ratio of semiprofessional to professional graduates
1st Five-Year Plan (1929–32)	291	170	1.71
2d Five-Year Plan (1933–37)	623	370	1.68
3d Five-Year Plan (1938–40)	678	328	2.07
War years (1941–45)	540	302	1.79
4th Five-Year Plan (1946–50)	1,278	652	1.96
5th Five-Year Plan (1950–55)	1,560	1,121	1.39
6th Five-Year Plan (Projected, 1956–60)	(2,575)	(1,445)	(1.78)
6th Five-Year Plan (Actual, 1956–59)	2,085	1,157	1.80
Actual, 1928–59	7,084	4,129	1.75
1st Seven-Year Plan, 1959–65 (anticipated)	3,200	2,300	1.39
Projection, 1959–65	3,430	2,345	1.47

Sources: Text tables III–19 and IV–50.

[11] *Plan Kadrov—1930, passim.*

[12] See editorial in *Pravda*, Dec. 1, 1959.

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11. *Women among Semiprofessional Students*

Chart XII presents data on the proportion of women among semiprofessional students, by field. (Appendix table III–A–2 gives the appropriate data for additional years.) It is interesting to observe that the proportion of women students in Soviet semiprofessional schools was growing by leaps and bounds until the mid-1950's. Since 1956 the beginning of a slight decline in the proportion of women in each field can be noticed. The trend in the composition of semiprofessional students by sex parallels very strongly a similar trend in higher education (see ch. IV). What is most striking is how completely the fields of health and education are dominated by women; they constitute over four-fifths of the students in these fields.

12. *Geographic Distribution and National Composition of Enrollment in Soviet Semiprofessional Schools*

Table III–23 presents data on the geographic distribution of Soviet semiprofessional school enrollment in comparison with the population distribution. It should be particularly noted that the Russian SFSR accounts for a significantly larger proportion of semiprofessional students than its population share in the U.S.S.R.'s total; this implies of course that on the territory of the Russian republic more semiprofessional education is offered.

The Soviet press often voices complaints about the very uneven geographic distribution of enrollment in semiprofessional schools.[18] The majority of semiprofessional schools are in fact operated in European Russia and predominantly in Central European Russia. In 1955 the Urals, Siberia, the Far Eastern, and Central Asian sections combined had only 6.6 percent of the total enrollment in semiprofessional schools in the entire U.S.S.R. In the last few years a campaign has been launched to move more semiprofessional schools into Siberia and Central Asia, but significant relocations cannot be accomplished with ease because of the dependence of semiprofessional training on established industrial sites in large cities.

Associated with the question of location is the potential expansion of extension-correspondence training on the semiprofessional level. Out of

[18] *SSO*, No. 3, 1956, p. 6.

TABLE III–23.—*Distribution of semiprofessional school enrollment, by union republic in 1955–56*

Republic	Enrollment		1959 Population distribution (percent)
	Thousands	Percent	
Russian	1,200.4	*61.2	56.3
Ukrainian	374.6	19.2	20.0
Belorussian	60.1	3.1	3.9
Uzbek	58.1	3.0	3.9
Kazakh	67.4	3.4	4.4
Georgian	30.7	1.6	1.9
Azerbaidzhan	29.3	1.5	1.8
Lithuanian	22.3	1.1	1.3
Moldavian	18.5	0.9	1.4
Latvian	25.4	*1.3	1.0
Kirgiz	13.6	0.7	1.0
Tadzhik	13.4	0.7	1.0
Armenian	17.0	0.8	0.8
Turkmen	13.6	0.7	0.7
Estonian	16.1	0.8	0.6
U.S.S.R. total	1,960.5	100.0	100.0

* Regional share larger than population.

Sources: *NKh—1956*, p. 232; *NarKhoz—1959*, p. 8, pp. 833–834.

TABLE III–24.—*Semiprofessional school enrollment by nationality (1958), compared with the national composition of the U.S.S.R. population (1959)*

Nationality	Semiprofessional school enrollment 1958		National composition of the U.S.S.R. population, 1959 (percent)
	Thousands	Percent	
Russians	920.1	64.4	54.9
Ukrainians	214.9	15.0	17.7
Belorussians	42.0	2.9	3.6
Uzbeks	21.0	1.5	2.9
Kazakhs	18.6	1.3	1.7
Georgians	18.5	1.3	1.2
Azerbaidzhans	15.7	1.1	1.4
Lithuanians	15.5	1.1	1.1
Moldavians	6.7	0.5	1.1
Latvians	12.5	0.9	0.7
Kirgiz	4.9	0.3	0.5
Tadzhiks	5.0	0.4	0.7
Armenians	16.2	1.2	1.4
Turkomen	4.8	0.3	0.5
Estonians	8.2	0.6	0.5
Subtotal	1,324.6	92.8	89.9
Other	103.1	7.2	10.1
Total	1,427.7	100.0	100.0

Sources: Appendix table III–A–3; *Pravda*, Feb. 4, 1960. Figures refer to full-time enrollment only.

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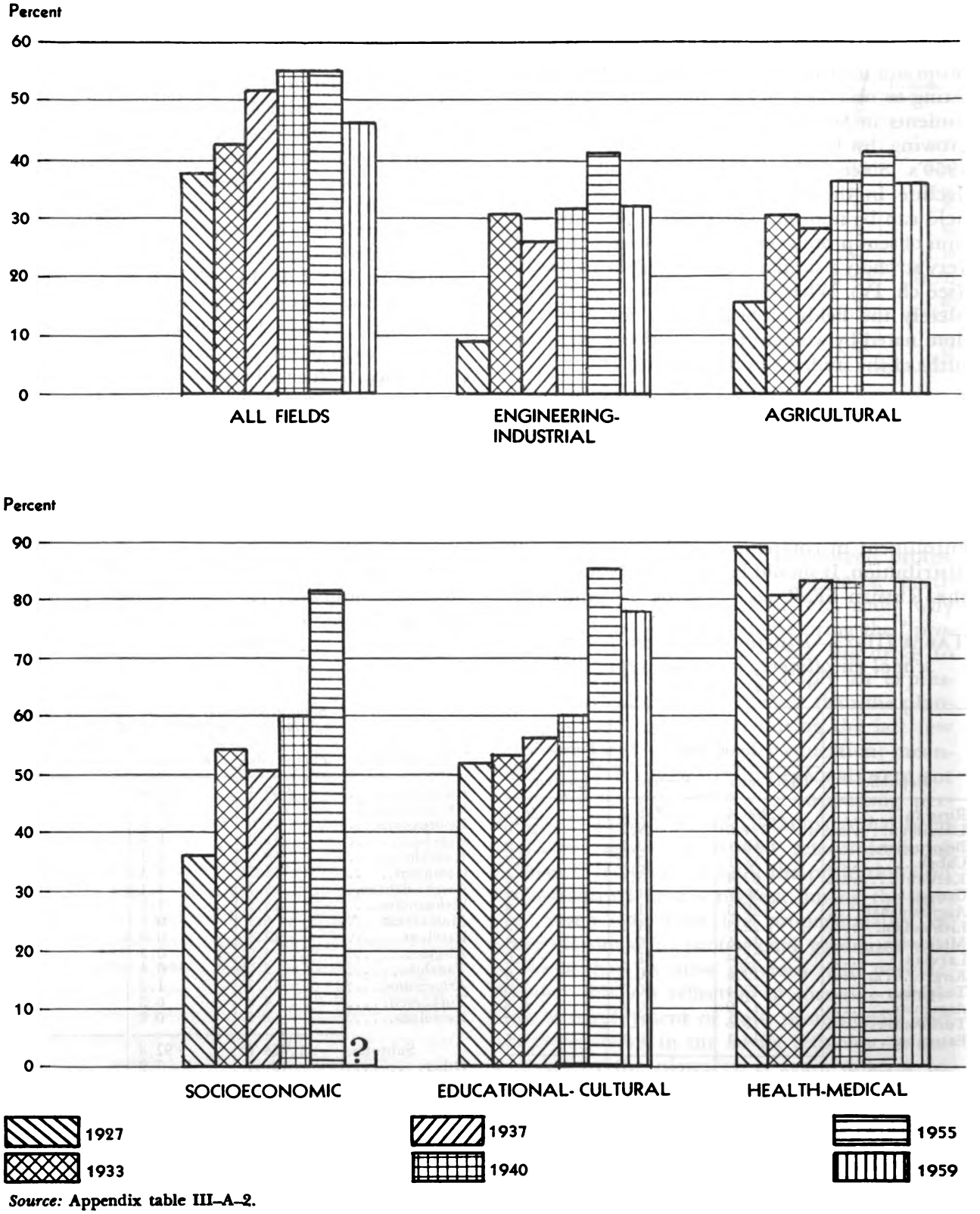
CHART XII.—PROPORTION OF WOMEN AMONG SOVIET SECONDARY SPECIALIZED STUDENTS BY FIELD IN SELECTED YEARS, 1927–59



Source: Appendix table III–A–2.

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18 *independent* extension-correspondence semiprofessional schools in the U.S.S.R., 10 are located in Moscow.[14] There has been much discussion about transferring some of these schools, particularly those specializing in agriculture, to other localities, but so far little has been done about it.

Also related to the pattern of location is the national composition of semiprofessional enrollment. Table III–24 gives a comparative summary—based on appendix table III–A–3 and the last Soviet population census—of the 1958 semiprofessional school enrollment by nationality and the national composition of the U.S.S.R. population as of January 1959.

As the table shows, Russians represent 64 percent of the total semiprofessional school enrollment, while their share in the population is only 55 percent. Only Russians, Georgians, Latvians, and Estonians have an enrollment representation higher than their respective share in the population.

Semiprofessional School Facilities and Teaching Staffs

During the last three decades (1928-58) the number of semiprofessional schools increased about threefold. The expansion in the early 1930's, when many regular schools were converted into semiprofessional schools, raised the number from 1,054 in 1928 to 3,509 in 1932. Since that time the number of semiprofessional schools has fluctuated between 2,600 and 3,800. The number of semiprofessional schools as of January 1961 was 3,328.

Table III–25 below, based on the more detailed data in appendix table III–C–1, shows the number and average size of semiprofessional schools, as well as regular (day and evening) enrollment figures for selected years.

After the initial expansion during the First Five-Year Plan period mentioned above, there followed in the mid-1930's a phase of consolidation and contraction. By the late 1930's another spurt of growth took place, this time primarily in the education and health fields. There followed a setback in the 1940's caused by the Second World War, but by 1954 the number of semiprofessional schools was restored to the 1940 level. Since then, the number has been on the decline again.

The average size of semiprofessional school enrollment is relatively small, and remained fairly stationary until after World War II. By 1950, the average size of enrollment in a semiprofessional school rose to about 327 students, as compared to 218 in 1940. Towards the mid-1950's the figure grew to 425, and remained about the same through 1958. It fell to 410 in 1959.

Unfortunately, we do not have recent information on the distribution of semiprofessional schools by field. It is apparent from the data in appendix table III–C–1 that in the initial phase of expansion in the early 1930's predominantly engineering-industrial and agricultural semiprofessional schools were opened. Later on, in the mid-1930's, the social service fields (education and health) were favored.

Appendix table III–C–2 presents a tabulation of identifiable semiprofessional schools,[15] which shows that in 1959 approximately 1,050 semiprofessional schools operated in the engineering-industrial field, about 620 in the agricultural field, and another 610 in educational-cultural fields. These figures are not exhaustive, for the institutional directories do not give a complete

[14] *Sprav SSU–1959, passim.*

[15] Unlike the reporting of the number of semiprofessional schools in aggregate, the tabulation in appendix table III–C–2 is based on the processing of the *institutional* directory, *Sprav SSU–1959.*

TABLE III–25.—*Number of semiprofessional schools, enrollment, and average size, for selected years, 1928–59*

	1928	1932	1935	1940	1950	1954	1958	1959
Regular (day and evening) enrollment (thousands)	208	797	661	820	1,117	1,604	1,428	1,375
Number of semiprofessional schools	1,054	3,509	2,597	3,773	3,424	3,795	3,346	3,329
Average size of enrollment	198	228	225	218	327	425	427	410

Sources: Appendix tables III–A–1–E and III–C–1.

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tabulation of all institutions, but it seems justifiable to say that currently about one-third of all Soviet semiprofessional schools are in the engineering-industrial field.

Throughout the years Soviet authorities have been reluctant to reveal the actual size of the teaching staffs employed in semiprofessional establishments. It is known that many semiprofessional school instructors are recruited on a part-time basis from the ranks of teachers in other educational institutions.[16] Furthermore, a substantial number of instructors are recruited, on temporary assignment, from the staffs of the industrial enterprises with which the semiprofessional schools are associated. These factors may partly explain the official reluctance to disclose information on the number of semiprofessional schoolteachers. From the information that is available, we know that at the beginning of 1930 there were about 63,000 semiprofessional school instructors.[17] It has been estimated that in 1949-50 the number was about 150,000,[18] and about 200,000 [19] at the end of 1956. The student-teacher ratio in 1957 was therefore approximately 8 to 1, which is just a moderate change from the situation in 1930, when the ratio was 9 to 1.

The Soviet Semiprofessional Graduate

Most graduates of Soviet semiprofessional schools are required to accept employment assigned to them for at least 3 years at a place designated by the ministry under whose direct jurisdiction the training was given. Upon completion of this job assignment, they may apply on an equal basis with other applicants to regular higher educational establishments. An exception is made only for students in the top 5 percent of the graduating class, who may apply to a higher educational establishment immediately upon graduation. It is stipulated that they may pursue higher education only in the field of their former specialization, but this provision is not rigidly enforced. The rest of the students may apply for acceptance in higher education extension-correspondence courses during their 3-year job assignment. However, under this arrangement, the injunction to remain within one's original field of specialization is now being enforced with increasing rigor.

Most semiprofessional school graduates acquire sufficient practical knowledge to perform certain specialized functions. They receive theoretical preparation in certain specialized fields, but their training restricts them to narrow practical pursuits. Since entrance into semiprofessional schools usually takes place between the ages of 14 and 16, the students are 18 to 20 when they graduate. They have had from 8 to 10 years of general education, or its equivalent, and about 2 or 3 years of specialized training of a primarily practical nature. The majority of these specialists are then assigned to jobs. After this type of training, there was in the past only limited opportunity for a select few, perhaps 10 to 15 percent in the long run and 5 percent immediately upon graduation, to continue on to higher education. Whether or not, as a result of the educational reform, the terminal nature of semiprofessional training for the vast majority of graduates will be modified is still not clear.

Semiprofessional Education Prospects

The decline which we have witnessed during the last few years in semiprofessional school enrollments is in part a reflection of current Soviet demographic trends—the shortage of young people. At the same time, according to official admission, the semiprofessional school administrative agencies—ministries and regional economic councils—tended to curtail this type of training.

These tendencies on the part of Soviet administrators directly concerned with semiprofes-

[16] *Sovmestitel'stvo*, i.e., holding a staff appointment in one institution and teaching in another at the same time, is frequently mentioned. It is apparently much more frequent among semiprofessional school teachers than among the teaching staffs of other Soviet educational institutions. *Sovmestitel'stvo* was, and to some extent still is, a general phenomenon in the U.S.S.R. and is not limited to teachers only. See further discussion in chs. IV and V.

[17] *NarKhoz—1932*, p. 539.

[18] *SPM*, p. 86.

[19] See discussion in chs. V and VI. The total number of instructors, research personnel, administrators, and specialists in Soviet semiprofessional and higher education combined was 391,000 (estimate from *Zhenshchina*, p. 53). It is assumed that about one-half of these were actually employed in semiprofessional schools.

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sional education are in conflict with the view expressed by Khrushchev, who declared at a plenum on automation:

> . . . we should pay more attention to the education of specialists with secondary specialized training. Technicums should play an important part. We have all the essential conditions for the further expansion and improvement of technicum education. A person who completes technicum education can, while employed on a job, continue his education in the extension-correspondence or evening programs in higher education. These will be very precious specialists who know their business. We have to stimulate the education of these specialists by all means.[20]

But in what kind of jobs are the semiprofessional school graduates to be employed? This is the question Khrushchev did not consider. It is obvious that after the recent revisions, the curricula are designed to prepare students for skilled workmen's occupations rather than for technical-supervisory jobs (within the *ETMP* employment category—see ch. VI), as has been the case during the previous 30 years. In the fall of 1959 there was talk in the Soviet press about the "lack of appreciation" of technicum education and the need to expand it further by "all possible means." [21] But if there is to be no particular job advantage resulting from such training, why should people want to undertake it in the first place? Therein lies the dilemma.

The current proposals emphasize that the expansion of semiprofessional training should proceed in extension-correspondence courses and evening programs. Thus far no well developed network of extension-correspondence schools on the semiprofessional level has been brought into existence, and to do so in the future will be difficult because semiprofessional education has been made so applied and job-oriented that it lends itself to a far lesser extent than higher education to part-time instruction. Moreover, localization and geographic concentration of semiprofessional education also stand in the way of such expansion. Yet, by utilizing existing institutions which will operate "sandwich" programs, such expansion is in the making. First-year admissions in the fall of 1960 reached the alltime high of 769,000, of which 46 percent (354,000) entered part-time evening and extension-correspondence programs. Thus, after the current decline, a substantial increase in the number of semiprofessional graduates can be expected again after 1963.

The effort to persuade effectively those already employed to seek semiprofessional education has also run into a snag. Despite the priority extended to applicants with an employment record, only 15 percent of the students entering semiprofessional schools in 1957 had had employment experience.[22]

In spite of the decision in the mid-1950's to make 10-year-school training mandatory for admission to semiprofessional schools, the future of these advanced programs remains uncertain as the educational reform progresses. Soviet administrators who are directly concerned with the employment of semiprofessional school graduates would rather see them enter the labor force young and thus advocate semiprofessional training after only 8 years of general education.

Many other problems remain. Soviet authorities, after three decades, are still concerned with planning how "to estimate the actual demand for these specialists for all economic regions." [23] Textbooks, facilities, teachers—all are bottleneck problems and in order to resolve them, semiprofessional schools, say Soviet spokesmen, "must receive more care and attention" in the years to come.

[20] *Pravda*, July 2, 1959.
[21] *Ibid.*, Dec. 1, 1959.
[22] *SSO*, No. 8, 1958, p. 15.
[23] *Pravda*, Dec. 1, 1959.

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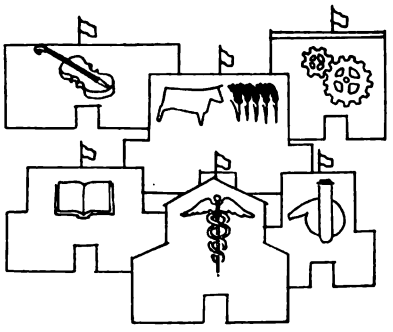

CHAPTER IV

Higher Professional Education

The objective of this chapter is to give as full an account as possible of Soviet policies and practices in professional education, to describe institutions and types of training, and to consider quantitative and qualitative aspects of instruction programs so as to enable the reader to judge for himself the scope and the direction of Soviet efforts in higher education.

The pride communist leaders take in the quantitative gains made by the Soviet Union in higher education is expressed in these words of Khrushchev: "The capitalists always considered us a backward people. But now we have more engineers and more technical intelligentsia than any capitalist country." [1] Yet Soviet leaders, including Khrushchev himself, admit:

> While we can be fully satisfied with the quantitative aspects of this business . . . , we should devote more serious attention to the quality of training of specialists. Our greatest shortcoming is the weak tie between higher education and practice and production; and the lag [of higher education] behind contemporary advances in technology. Higher educational establishments still fail to provide young engineers and agronomists with sufficient knowledge about problems of economics and the organization of production. The industrial practice of students requires considerable improvement. . . . Students completing the course of study should be closely tied to [the realities of] actual life, to production, and to specific industrial enterprises, collective farms and state farms, so that they may gain concrete practical knowledge.[2]

These official statements clearly point up the problems of Soviet higher education. Like other levels of education, professional training is called upon to conform to the maxims of functional education. Quantitative gains are contrasted with the quality of education, but the quality of education is defined ambivalently as that which best serves practical, applied ends.

Is higher education really of better quality if it is so oriented? All we can do is to point out the basic issues in the Soviet attitudes toward higher professional education.

In many respects Soviet higher education is different from that in American and most West European countries. All higher education in the Soviet Union is public, and all higher education programs are designed to develop individual talent for the purpose of serving the state. In addition, as already pointed out, all institutions of higher learning today are operated by the central government,[3] which determines all such questions as what institutions to maintain, the programs of instruction to offer, the number of students to enroll, the staffs to keep, the facilities to operate, and many other questions of educational policy and practice. Individual institutions have some autonomy in deciding minor operational matters, but all major questions of educational policy are resolved by the all-union government. This centralized administration is the backbone of Soviet higher education, which is thus integrated into the overall centralized planning of the economic and social development of the country.

In the organization of actual instruction in

[1] *Pravda*, Jan. 22, 1956.

[2] Khrushchev's speech at the 20th Party Congress, reported in *Pravda*, Feb. 15, 1956.

[3] Higher education in pre-Revolutionary Russia was also operated by the central government, and private institutions of higher learning did not exist. See Johnson, *Russia's Educational Heritage, passim.*

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higher education, there are various arrangements in the grouping of students, graduates, and staffs which merit attention. These are:

(1) *Types of institutions.*—There are a variety of groupings of Soviet higher educational establishments differing in type, name and administrative function. But whatever the administrative relationship, whatever the type or whatever the internal instructional program offered, these are individual institutions which, as separate units, manage their own enrollments, staffs, and facilities in accordance with policies set by the central government. These individual and separate units grouped by type or relationship —such as all engineering-technical schools, all medical institutions, all agricultural institutes, etc.—comprise the branches of higher education.

(2) *Specialty groupings.*—Within each institution of higher education, students may take various programs of instruction. Each of these programs is intended to educate the student in a given training specialty, which also bears the stamp of occupational specialty. The occupational specialty (*kvalifikatsiia*) is assigned to each and every training specialty (*spetsial'nost'*), for it is ideally anticipated that a graduate in a given training specialty will take employment in the corresponding occupational specialty. In reality, there may be wide divergence between the two in actual employment. Each of the training specialties requires a particular set of instruction subjects in a given curriculum. There are many training specialties: for medical doctors of various kinds, engineers of various kinds, different kinds of agricultural specialists, and teachers of a variety of subjects. Individual higher educational establishments do not offer training in broad fields, such as "engineering," but specifically in different training specialties, such as "metallurgical engineering for nonferrous metallurgy." The individual specialties are aggregated into specialty groups, and in turn into fields or branches. Since most Soviet higher educational establishments are oriented to prepare specialists for a particular industry sector or branch of employment, the specialty groups aggregated into branches coincide largely with the grouping of institutions themselves by branch. (See discussion below, and especially table IV–47.)

(3) *Types of instruction programs.*—In terms of student attendance, Soviet higher education offers different types of instruction programs. These include (1) full-time day, (2) part-time evening, and (3) part-time extension-correspondence programs. Specifically designated institutions sometimes offer just one of these types, but often the same higher educational establishment offers all three. As a result of the educational reforms, the blending of all three types in certain specialty fields is currently under experiment; and in some fields of training the original "full-time day" programs will now include all three types of instruction. The evening and extension-correspondence programs will remain as separate types, however. The various programs cut across the institutional arrangement and specialty groupings.

An examination of these three arrangements merely provides the framework for the study of Soviet higher education. To learn which departments offer instruction and how instruction is conducted for students in different institutions, diverse specialties, and types of program, a further look at the structure of individual higher educational establishments is necessary. A given subject, for example, may be taught with different degrees of intensity in the same institution, so as to accommodate students of different specialties. It is also necessary to examine how the content of instruction in a given specialty varies between different institutions. Instructional techniques, textbooks, grading, examinations, thesis requirements, faculty, and many other topics will be discussed in this chapter in relation to the factors of quantity and quality in Soviet higher professional education.

Types of Soviet Higher Educational Establishments

Soviet higher education embraces a wide range of training specialties and a large number of establishments for conducting professional training in these specialties. Some institutions which are singled out separately would be analogous in the American setting to faculties or "schools" of large universities. A complete list of Soviet

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civilian higher educational establishments as of 1959, together with all identifiable divisions therein and all available data on the training specialties offered, has been prepared from Soviet sources.[4]

In 1959 the Soviet Union had 719 identifiable higher educational establishments.[5] All Soviet higher educational establishments are *professionally* oriented establishments; the Soviet Union does not have general education or liberal arts colleges or nonprofessionally oriented undergraduate programs of instruction such as are commonly found in American colleges and universities. Soviet institutions of higher learning combine under one roof American undergraduate college education and the professional school training of American universities. Because professional higher education in the Soviet Union is provided along specialized functional lines, there is an inclination to refer to it as "training" rather than "education." But this is largely an exercise in semantics. This study uses the words "education" and "training" interchangeably, and no particular qualitative difference is or should be implied. If, however, narrowly specialized higher education in the Soviet Union is "training," then so is the "education" offered in American professional schools. What distinguishes Soviet higher education as a distinct development in the concept of functional education is the *degree* of specialization derived from formal training. Largely because of this specialization, Soviet professional schools are run as independent units—"institutes"—which are physically separated from one another. Thus the bonds which exist between different faculties of American or West European universities are broken in the Soviet case, and each Soviet "institute" is a separate administrative unit with its own faculty, facilities and students.

A Soviet institution of higher education is commonly called *VUZ* (*Vysshee Uchebnoe Zavedenie*—higher educational establishment); individual establishments are also often designated by abbreviations.[6] There are approximately 200 abbreviations of various institutions encountered in Soviet sources.

Because of the historical pattern of growth of Soviet institutions of higher learning, it became customary, and convenient as well, to classify all Soviet higher educational establishments either as universities or institutes. In 1959 there were 40 universities and 656 regular day institutes in the U.S.S.R. (not counting 23 independent extension-correspondence institutes, or 49 independent evening branch institutes). The word "institute" in Russian is always associated either with higher education or with advanced research of one type or another; it is not to be confused with usage of the term in America, where "institute" may sometimes be used to designate vocational-technical (semiprofessional) training establishments such as technical institutes and institutes for clerical, secretarial and sales personnel. The Soviet institutes offer instruction in engineering and sciences "definitely of the university level, comparable to M.I.T., Cal Tech, Carnegie Tech, etc."[7] In other fields, such as pedagogy, medicine and agriculture, they are professional higher education "schools" in the same sense, for example, that American universities have medical or law "schools."

The distinction between a university and an institute in the U.S.S.R. lies in the fact that universities usually offer somewhat broader training and instruction in a variety of fields, largely the natural sciences, social sciences and humanities. Institutes provide narrower specialization, training primarily in related groups of fields, in one or in closely related areas of professional training such as in a given branch of engineering, agriculture or medicine. Further-

[4] This information is presented in appendices IV–B–1 (directory of specialties by institution), IV–B–2 (directory of divisions of higher educational establishments), and IV–B–3 (directory of institutions by division and specialty). While partial tabulations of Soviet institutions, their divisions and training specialities have appeared before in Western sources (*SPM, passim;* Korol, *Soviet Education, passim*), this is the first comprehensive directory in English. A number of the summary statements and tables in ch. IV would not have been possible without first preparing these basic directories. Parenthetically, the cross-directory of divisions and, particularly, specialties by institution (appendix IV–B–1) in which they are offered does not exist in Soviet sources.

[5] Appendix table IV–C–3. The total number has fluctuated in the last 20 years, from about 700 to approximately 870 identifiable "units." There is a continuing process of opening, closing, consolidating or branching off of various units. From the early 1950's to date the number has declined, largely because of the closing of 2-year teacher institutes.

[6] For example, *MAI—Moskovskii Aviatsionnyi Institut* (Moscow Institute of Aviation Engineering); *MGU—Moskovskii Gosudarstvennyi Universitet* (Moscow State University); *KhKhTI—Khar'kovskii Khimiko-Tekhnologicheskii Institut* (Khar'kov Institute of Chemical Technology).

[7] R. Ewell, "23 Days in Russia," *The University of Buffalo Alumni Bulletin*, vol. XXV, No. 1 (spring 1958), 2.

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more, in the natural science fields, universities offer more theoretical and less applied training to students who plan to teach or engage in theoretical research, while institutes give primarily applied professional education, such as is required for specialized professional jobs in industry, agriculture, business, medicine, elementary-secondary school teaching, etc. Universities are concerned with many fields of knowledge; institutes tend to concentrate on only one. In fact, many Soviet institutes were once departments of universities; they were detached during the 1920's and especially during the early 1930's, when theoretical knowledge and applied knowledge were viewed as distinct educational objectives. After the educational reforms of the early 1930's, the functional differentiation between the two types of educational establishments remained even though the blending of theory and practice reappeared in Soviet professional higher education.

1. *Universities*

The history of Russian university education begins in the 18th century. The first attempt to establish higher education in Russia was made under Peter the Great in 1724, when the higher school of learning of the newly created Academy of Sciences was set up.[8] This was five centuries after great European universities had come into being, and almost a century after adaptations of British colleges were transported across the ocean to the American colonies. The university of the Academy of Sciences never flourished. Its doors were closed in 1766 after 42 unsuccessful years during which annual enrollment never exceeded a few dozen. Meanwhile, in 1755, a decade before the university of the Academy closed,[9] Prince Shuvalov, at the suggestion of Russia's self-taught genius and peasant's son, Lomonosov, had persuaded the Empress Elizabeth to set up Russia's first independent, secular and civilian university. The Imperial University of Moscow (today called *MGU*—Moscow State University) thus came into being. Almost half a century passed before another university was established in 1804 in Kazan', and during the 19th century six more universities were opened throughout Russia. The other 32 universities of the 1959 total of 40 were not established until this century, about half of these in the last 25 years.

Soviet university training generally requires five or five and a half years, but in some fields is currently being extended to 6 years. The 1959 average university enrollment was 5,300, of which an average 3,100 were enrolled as regular (day) students. Two universities—Moscow and Leningrad—had enrollments of more than 20,000 students each; while there were 10 universities with enrollments of under 3,000.

The numerical growth of Soviet universities, their enrollments, number of acceptances and graduations during the last 20 years are shown by the data in table IV–1. Between 1940 and 1958, while the number of universities increased by 11, enrollment almost tripled, and the annual number of graduations increased about 4.5 times. Distribution by type of program of the 1958 enrollment of 213,000 students in 40 universities was as follows:[10]

TABLE IV–1.—*Number of, enrollment in, and graduations from Soviet universities in selected years, 1940–59*

Academic year	Number of universities	Total enrollment	First-year enrollment	Number of graduates
1940–41.....	29	75,682	22,334	7,963
1950–51.....	33	109,737	27,127	15,626
1955–56.....	33	[a]166,256	36,690	22,866
1958–59.....	40	213,000	[b]43,700	[c]37,700

[a] Among these, regular full-time students numbered 115,600 (table IV–2).
[b] Refers to anticipated acceptances in 1959–60.
[c] This total includes about 8,000 evening and extension-correspondence graduates.
Sources: *KS–1956*, pp. 228–29; *VVSh*, No. 7, July 1959, p. 14.

	Enrollment	Distribution in percent
Regular day students.....	123,000	57.8
Part-time evening students	12,000	5.6
Part-time extension-correspondence students.....	78,000	36.6
Total	213,000	100.0

[10] *VVSh*, No. 7, July 1959, p. 14.

[8] A. S. Butiagin and Iu. A. Saltanov, *Universitetskoe obrazovanie v SSSR* (University Education in the U.S.S.R.), Moscow, 1957, p. 9.
[9] The Academy itself, however, ever since its establishment in 1724, has continued as the highest national institution for the advancement of science and research in all fields of knowledge. University training was its supplementary function only in its original charter.

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From 1954 to 1958 university enrollment in regular (day) programs was virtually at a standstill; almost the entire increase in enrollment took place in the evening and extension-correspondence programs. Of the total number of graduates of Soviet higher educational establishments in the last 30 years, the university proportion was about 12 percent. As of 1959, Soviet universities accounted for about 9 percent of total U.S.S.R. higher education admissions, 10 percent of total enrollment and 12 percent of the total number of graduates.[11] Thus in terms of numbers, universities occupy a relatively small place in the Soviet higher education complex; their importance, however, lies in their qualitative contribution.

Today, most Soviet universities are multidivisional training establishments. Each division (*fakul'tet*) of a university offers a number of programs leading to a professional training specialty for graduates who complete the program. The majority of Soviet universities have six to eight divisions. Thirty-five different types of divisions are known to exist,[12] the most common being: physical sciences—mathematics, geology-geography, biology, chemistry, philology, history, economics, and jurisprudence. There are two small universities where the number of divisions is only 4, and only 5 in which the number is 10 or more. Altogether, in 1959 there were 269 university divisions, or about six per university.

In 1959 the 269 divisions of the 40 Soviet universities provided 556 specialty offerings, or an average of 14 per university or about 2 per university division. Out of the 556 specialty offerings, 414 are called "university specialties." [13] The remaining 142 were "nonuniversity specialties," such as geology,[14] mining, mechanical engineering, agriculture, medicine, and some others. In other words, the presence of specialties with narrow applied specialization (such as engineering, geology and medicine) is not so rare an occurrence in Soviet universities as has commonly been supposed.

In 1959 the number of "university specialties" alone was 32,[15] with the total number of offerings 414, which means that there were, on the average, 13 offerings of the same specialty.[16]

Table IV–2 summarizes the information on Soviet universities by location,[17] date of founding, number of divisions, number of specialties offered in 1959, and whatever data are available on full-time enrollment as of the fall 1955. It should be noted that full-time day enrollment in recent years has not changed significantly (1955—116,000; 1958—123,000). Instruction was also offered in the evening divisions of 25 Soviet universities and in the extension-correspondence divisions of 37 universities. Twenty universities were also engaged in advanced degree training programs. (See ch. V.)

[11] See a detailed discussion of quantitative trends in this chapter below. The totals may be found in appendix tables IV–A–1–S, IV–A–1–A, IV–A–1–E, and IV–A–1–G.

[12] For the names of individual divisions, see appendix IV–B–2; a summary tabulation is provided in text table IV–5.

[13] Listed in the decimal code series 2000, appendix IV–B–1. See also discussion below.

[14] Although geology-geography is one of the major university divisions, "geology" is classified as an institute specialty.

[15] See further discussion below and table IV–8. For a detailed listing of all Soviet specialties and institutes where they are offered, see appendix IV–B–1. "University specialties" are the 2000 decimal code series.

[16] The specialties offered in evening and extension-correspondence divisions of regular higher educational establishments which offered day programs of instruction were not counted separately; for without exception, they duplicate the regular specialty offering and thus do not involve an independent commitment of facilities and staffs of a regular higher educational establishment. This is not the case, of course, when the evening branch is a separate unit in a different locality or an extension-correspondence higher educational establishment is a separate institution.

[17] All Soviet university names are prefixed by "State University of . . ."; some have an honorific name as well, i.e., those named after Lenin, Lomonosov, Stalin, Shevchenko, and Gor'kii.

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TABLE IV–2.—*Soviet universities: name and date of founding, number of divisions and specialties in each, and full-time day enrollments*

University (and location)	Year founded	1959		Regular enrollment (1955)	Evening	Extension-correspondence
		Number of divisions	Number of specialties			
Azerbaidzhan (Baku) *	1919	10	19	3,090	Yes	Yes
Bashkir (Ufa)	1956	5	9	.....	No	Yes
Belorussian (Minsk) *	1921	8	13	3,152	Yes	Yes
Vilnius (1579) *[a]	1940	7	18	3,183	Yes	Yes
Voronezh *	1918	7	13	2,313	Yes	Yes
Gor'kii	1918	5	9	2,339	No	No
Dagestan (Makhach-Kala)	1956	5	9	.....	No	Yes
Far Eastern (Vladivostok)	1956	5	12	.....	No	Yes
Dnepropetrovsk *	1918	5	7	3,509	Yes	Yes
Erevan *	1921	10	16	3,141	Yes	Yes
Irkutsk	1918	7	14	2,443	Yes	Yes
Kabardino-Balkar (Nal'chik)	1956	4	10	.....	No	Yes
Kazan'*	1804	8	15	3,568	Yes	Yes
Kazakh (Alma Ata) *	1934	8	15	3,778	Yes	Yes
Kiev *	1834	10	19	5,754	Yes	Yes
Kirgiz (Frunze)	1951	7	13	2,397	No	Yes
Kishinev	1946	5	12	2,041	Yes	No
Latvian (Riga) (1919) * [a]	1940	6	13	3,636	Yes	Yes
Leningrad *	1819	12	29	9,444	Yes	Yes
L'vov (1661) * [a]	1939	11	18	3,838	No	Yes
Mordvin (Saransk)	1957	6	13	.....	No	Yes
Moscow *	1755	12	35	15,544	Yes	Yes
Novosibirsk	1959	.....	5	.....	.....	.....
Odessa *	1865	6	9	2,118	Yes	Yes
Perm'	1916	9	17	2,445	No	Yes
Petrozavodsk	1940	4	9	1,516	Yes	Yes
Rostov *	1917	6	12	2,478	Yes	Yes
Saratov *	1909	7	15	3,410	Yes	Yes
Central Asiatic (Tashkent)*	1920	8	18	4,058	No	Yes
Tadzhik (Stalinabad)	1948	5	12	1,585	Yes	Yes
Tartu (1637) *[a]	1940	5	19	2,870	No	Yes
Tbilisi *	1918	10	21	4,865	Yes	Yes
Tomsk *	1888	7	17	3,118	Yes	Yes
Turkmen (Ashkhabad)	1950	5	11	2,263	Yes	Yes
Uzhgorod	1945	6	8	1,629	No	Yes
Uzbek (Samarkand)	1933	4	9	1,694	Yes	Yes
Ural (Sverdlovsk)	1920	5	9	2,147	Yes	Yes
Khar'kov *	1805	7	12	3,869	Yes	Yes
Chernovtsy (1875) *	1940	7	9	2,417	No	Yes
Iakutsk	1956	5	13	.....	No	Yes
Total (40 universities)	.....	269	556	[b]115,652	25	37

[a] Original date of founding.
[b] Does not include enrollment of universities established after 1955.
* Has advanced degree programs, leading to candidate and/or doctor degrees.
Sources: *Sprav VUZ—1959, passim.* Enrollment figures derived from data in *KS—1956*, pp. 218–29.

The number and distribution of regular university students by the division in which they were registered in 1955–56 are given in table IV–3. Regular students numbered about 116,000, comprising about 70 percent of the total enrollment (166,000—table IV–1, i.e., including evening and extension-correspondence students). Regular students were enrolled in 247 divisions in 1955 (1959—269 divisions), an average of 470 per university division. There was, however, wide variation from this average, with large enrollments in some divisions (in physics-mathematics and in philology, over 600 students) and small enrollments in others (geology, about 200; Eastern cultures, 120). The data in table IV–3 also indicate that the training effort of Soviet universities favored mathematics and the sciences over the humanities and social sciences, roughly 55 to 45 percent. In the mid-1950's better than one-half of Soviet university students were enrolled in scientific fields. Universities also offer training to a number of

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TABLE IV–3.—*Distribution of regular (day) students in Soviet universities by division (fakul'tet) of study, 1955–56*

Divisions	Number of divisions	Regular enrollment	Distribution in per cent
Mathematics, pure sciences and applied sciences, total.....	130	63,783	55.5
Physics-mathematics	26	15,656	.....
Physics.....	6	6,254	.....
Mathematics-mechanics.....	8	5,872	.....
Engineering physics.	1	1,362	.....
Engineering.....	3	1,080	.....
Radio physics.....	3	1,322	.....
Subtotal: mathematics, physics, engineering.	(47)	(31,536)	(27.4)
Chemistry.....	25	8,733	.....
Biology-chemistry..	2	663	.....
Biology.....	16	4,207	.....
Biology-soil science.	14	6,009	.....
Forestry and soil science.....	1	314	.....
Agriculture.....	1	351	.....
Medicine.....	3	1,864	.....
Subtotal: chemistry-biology....	(62)	(22,141)	(19.3)
Geology.....	16	8,122	.....
Geology-geography..	5	1,984	.....
Subtotal: geology-geography..	(21)	(10,106)	(8.8)
Social sciences and humanities, total.....	115	50,388	43.9
Geography [a].....	18	6,513	.....
Economics.....	13	4,683	.....
Jurisprudence.....	18	6,910	.....
Economics-jurisprudence.....	1	373	.....
Subtotal: socioeconomic.....	(50)	(18,479)	(16.1)
History-philology...	15	8,287	.....
History.....	18	6,471	.....
Philology.....	18	12,630	.....
"Eastern cultures" (Asiatic studies)..	4	492	.....
Foreign languages...	5	1,823	.....
Journalism.....	3	1,588	.....
Philosophy.....	2	618	.....
Subtotal: history, language and literature.....	(65)	(31,909)	(27.8)
Other unspecified, total..	2	651	0.6
Total.....	247	114,822	100.0
Unaccounted residual.....	.....	830	negl.
Grand total (undistributed)....	247	115,652	100.0

students in such applied fields as engineering and medicine. The socioeconomic field (economics, jurisprudence) accounted for about 10 percent of the total enrollment in universities in 1955–56.

For the purpose of actual instruction, the divisions (*fakul'tety*) of universities are further subdivided into departments (*kafedry*) which deal with one or several subjects of instruction. The divisional and departmental structure of Soviet universities may best be understood by examining, for example, the structure of Leningrad State University:

Division and Department Structure of Leningrad State University as of Year End 1957 [a]

Division of Mechanics-Mathematics (27) [b]

Departments: (1) theoretical astronomy; (2) stellar astronomy; (3) astrophysics; (4) geodesy and gravimetry; (5) algebra and numbers theory; (6) geometry; (7) mathematical analysis; (8) differential equations; (9) mathematical physics; (10) theory of probability; (11) computation mathematics; (12) general mathematics;* (13) theoretical mechanics; (14) theory of deformations; (15) hydro-aero mechanics.

Independent Units: Astronomical Observatory; Research Institute of Mathematics and Mechanics; Independent Laboratory of Optical Analysis of Material Strain and Stress; Independent Laboratory of Aerodynamics; Independent Laboratory of Gaseous Dynamics; experimental shops.

Division of Physics (26)

Departments: (1) theoretical physics; (2) mathematics and mathematical physics; (3) first-level general physics;* (4) second-level general physics;* (5) optics; (6) spectroscopy; (7) nuclear reactions; (8) molecular physics; (9) nuclear spectroscopy; (10) electrophysics; (11) radiophysics; (12) physics of the atmosphere; (13) physics of the earth's crust (Moho).

Independent Units: Research Institute of Physics; Independent Cyclotron Laboratory; Independent Laboratory of Spectroscopy; Independent Laboratory of Nuclear Spectroscopy; Independent Labora-

See col. 2, p. 214 for [a] [b] *footnotes.

[a] Obviously, some geography students could be classified under physical sciences, but we do not have sufficient information to ascertain the proportion of economic and social geographers vs. physical geographers. In our opinion, the majority of students in this division of a university are trained as teachers primarily in economic, social and political geography.

Source: Data compiled from *KS–1956*, pp. 218–29. Note that the totals distributed by field and the undistributed total do not gibe exactly, which results in an "undistributed residual."

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tory of Dynamics of Stress and Strain; Independent Laboratory of Optics; Independent Laboratory of Semiconductors; Independent Laboratory of Ultrasonics; Independent Laboratory of Photocatalysts; experimental shops.

Division of Chemistry (18)

Departments: (1) inorganic chemistry; (2) physical chemistry; (3) theory of solutions; (4) electrochemistry; (5) colloidal chemistry; (6) radioactive materials chemistry; (7) analytical chemistry; (8) organic chemistry; (9) theory of organic compounds; (10) high-molecular compounds; (11) engineering chemistry.

Independent Unit: Research Institute of Chemistry.

Division of Biology–Soil Science (39)

Departments: (1) botany; (2) geobotany; (3) plant physiology; (4) Darwinism; (5) genetics and selection; (6) microbiology; (7) zoology of invertebrates; (8) zoology of vertebrates; (9) anatomy and histology; (10) embryology; (11) entomology; (12) hydrobiology and ichthyology; (13) physiology of upper nervous systems; (14) physiology of animals and human beings; (15) biochemistry; (16) soil science; (17) soil geography; (18) agronomy.

Independent Units: Institute of Biology; Institute of Physiology.

Division of Geology (20)

Departments: (1) general geology; (2) historical geology; (3) paleontology; (4) petrography; (5) mineralogy; (6) crystallography; (7) mineral deposits; (8) hydrogeology; (9) soil mechanics; (10) geophysical surveying of mineral deposits; (11) geology and exploration of deposits of radioactive minerals.

Independent Units: Research Institute of Earth's Crust (Moho); Independent Laboratory of Paleontology.

Division of Geography (15)

Departments: (1) physical geography; (2) economic geography; (3) botanical geography; (4) geomorphology; (5) hydrology of land; (6) oceanography; (7) meteorology and climatology; (8) cartography.

Independent Unit: Research Institute of Geography and Economics.

Division of Economics (no professors or doctors; 25 candidates and associate professors [*dotsents*])

Departments: (1) political economy;* (2) economy of branches of industry; (3) statistics and accounting; (4) economics of imperialism [the capitalist world].

Independent Units: none.

Division of History (16)

Departments: (1) history of the U.S.S.R.; (2) modern and contemporary history; (3) history of the Middle Ages; (4) ancient history of Greece and Rome; (5) history of art; (6) archeology.

Independent Unit: [The Research Institute of History was closed in 1950.]

Division of Philosophy (12)

Departments: (1) dialectical and historical materialism;* (2) history of philosophy; (3) logic; (4) psychology; (5) pedagogy.

Independent Unit: [The Research Institute of Philosophy, Economics and Jurisprudence was closed in 1950.]

Division of Jurisprudence (9)

Departments: (1) theory and history of government and jurisprudence; (2) government and administrative law; (3) international law; (4) civil law; (5) labor law; (6) agricultural and collective farm law; (7) civil procedures; (8) criminal law; (9) criminal procedures and criminology.

Independent Units: none.

Division of Philology (19)

Departments: (1) Russian literature; (2) Soviet literature; (3) foreign literature; (4) history of journalism; (5) theory and practice of the Soviet press; (6) general linguistics; (7) Russian language; (8) philology of Romance languages; (9) philology of Germanic languages; (10) philology of Slavic languages; (11) philology of Finno-Ugrian languages; (12) philology of classical languages; (13) phonetics; (14) English language;* (15) Germanic languages;* (16) French language;* (17) Russian language for foreign students.*

Independent Units: [The Research Institute of philology; (7) translations.

Division of Foreign Languages (number of senior staff unknown)

Departments: (1) methodology of teaching; (2) second [minor] foreign language;** (3) English language; (4) English philology; (5) Germanic languages and philology; (6) French language and philology; (7) translations.

Independent Units: [The Division of Foreign Languages is the former Leningrad State Pedagogical Institute of Foreign Languages which was incorporated into the university structure in 1956.]

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* V. Movrodin *et al., Leningradskii universitet* (Leningrad University), Leningrad, 1957, pp. 77–126.

[b] Number of senior staff members, professors and associate professors holding appointment in a division.

* Indicates all-university departments which are listed under a given division, but which conduct instruction for all other divisions as well.

** I.e., corresponds to our term "minor" as opposed to "major" field of concentration in higher education.

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Division of Far Eastern Studies (13)

Departments: (1) Chinese philology; (2) Korean philology; (3) Japanese philology; (4) Hindustani philology; (5) Iranian philology; (6) Mongol philology; (7) Turkish philology; (8) Arabic philology; (9) philology of African languages; (10) history of the ancient East; (11) history of the Near East; (12) history of the Far East.

Independent Units: [The Institute of Far Eastern Studies was closed in 1950.]

On the division level: Mendeleev Archive; University Press; University Library.

Similar and more detailed information can be found for Moscow State University, which had 192 departments, grouped into 12 divisions, in 1955–56, as follows: [18]

Division	Number of departments
1. Mechanics-mathematics	[a] 20
2. Physics	[b] 28
3. Chemistry	13
4. Biology—soil science	26
5. Geography	14
6. Geology	13
7. History	16
8. Philology	18
9. Philosophy	5
10. Economics	6
11. Jurisprudence	12
12. Journalism	5
Total	176
Inter-divisional departments of sports, languages, pedagogy, political economy, dialectical and historical materialism	16
Total	192

[a] Plus a Research Institute of Astronomy
[b] Plus a Research Institute of Nuclear Physics

Of course, not all universities have as elaborate structures as Moscow and Leningrad. Smaller universities as a rule do not have independent institutes and laboratories, but other large universities as Kiev and Khar'kov have structures as complex as those of Leningrad and Moscow State Universities. We do not know the exact number of departments in all universities for a recent year, but in 1954 the number was 1,900.[19] The number has probably increased somewhat since.

According to the recent reorganization plan, Soviet universities will train (in addition to teachers) "primarily specialists for research establishments." [20] In connection with this intention, particular attention should be given to the newly formed Siberian university in Novosibirsk,[21] which is intended to become the most formidable training establishment for specialists in the natural sciences. It is to be a teaching outlet of the newly established Siberian branch of the Academy of Sciences of the U.S.S.R., and in its makeup (in 1959 it had already 20 academicians on its staff, mostly in the natural sciences) it promises to be the first inter-departmental basic science teaching-research establishment in the country.

Beginning in 1959 the admission of new students to university divisions of jurisprudence, journalism, philosophy and political economy was restricted exclusively to applicants who have had prior gainful employment for two or more years.[22] In philology, history and applied economics, admission priority was given to those with a prior employment record. However, in mathematics, physics and other sciences "the need for continuing education and the early development of ability" [23] was recognized, and, as in the past, recent secondary school graduates without previous employment could be admitted. Thus there was a differentiation in admission requirements according to university division, which underscores the fact that students in the sciences were given an early opportunity to develop their aptitudes, while this was denied or deferred to students in other fields.

Of all Soviet universities, Moscow State University has received the most publicity in the West, as well as in the U.S.S.R., as an elite establishment.[24] The oldest university in Russia, it is called the "greatest" institution, and is said to have educated since its establishment until

[18] Moskovskii Gosudarstvennyi Universitet (Moscow State University), Iu. A. Saltanov (ed.), *Otchet o deiatel'nosti Moskovskogo Gosudarstvennyi Universiteta imeni M. V. Lomonosova v 1955–56 uchebnom godu* (Report on the Activities of Moscow State University of M. V. Lomonosov in 1955-56), Moscow, 1960, *passim*. This source also lists the senior academic personnel in each department and the teaching and research activities of the staff.

[19] *VVSh*, No. 5, May 1954, p. 48.

[20] *Kazakhstanskaia pravda*, Dec. 17, 1958. Khrushchev himself suggested this in his educational reform proposals.

[21] *Pravda*, June 19, 1959; *Izvestia*, Sept. 4, 1959.

[22] *VVSh*, No. 7, July 1959, p. 14. See also section on admissions, below.

[23] *Idem*.

[24] B. Rubin, "Moscow University: The Summit of Soviet Higher Education," in Bereday and Pennar, *op. cit.*, pp. 164–74.

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1955 about 80,000 persons,[25] half of these in the last 40 years. The role of universities in general and of *MGU* in particular in developing Russian science has been very significant in the last hundred years.[26] In the training of basic science researchers, the lead of Soviet universities continues strong until the present time.[27] Although it is contemplated that in the future more universities will establish applied divisions, they will also continue to concentrate on basic research, and continue as training and research centers with a broader theoretical and interdisciplinary approach to professional higher education.

2. *Institutes*

"Institutes" (*instituty*) are the major source of professional graduates in the U.S.S.R. In 1959 there were 656[28] Soviet institutes which offered regular (day) education and 23 independent institutes which offered extension-correspondence exclusively. In addition, there were 49 independent evening branches operated by the institutes in localities different from that of the home institute. All institutes combined over the last three decades accounted for about 88 percent of the total number of Soviet higher education graduates.

Today the institutes provide no general education whatever, save the required courses in "social sciences" (i.e., political economy, history of the Communist Party, dialectical materialism) and a foreign language. However, many basic theory courses in a given specialty field are taught to facilitate the acquisition of applied specialized knowledge.

While most of these establishments are properly called institutes, some are called "higher school" (*vysshee uchilishche*). An example is Moscow's *VTU(B)* (*Vysshee Tekhnicheskoe Uchilishche imeni Baumana*—Bauman Higher Technical School), one of the best engineering schools in the country; or *LVMU* (*Leningradskoe Vysshee Morekhodnoe Uchilishche*—Leningrad Higher Maritime School), which trains, among other specialists, marine engineers. There are also a few higher educational establishments known as "academies."[29] such as the *LLTA* (*Leningradskaia Lesotekhnicheskaia Akademiia*—Leningrad Academy of Forestry Engineering). Finally, in the category of institutes belong also several art (*khudozhestvennye*) and theatrical schools (*teatral'nye shkoly*) and conservatories (*konservatoriia*).[30]

Although the majority of the presently existing institutes in the U.S.S.R. were formed during 1930–31 and 1931–32—when various divisions of the universities as well as of the institutes then in existence were detached and made into separate units—institutes rather than universities, even before the Revolution, were the predominant kind of higher educational establishment in Russia. In 1913, for example, of 95 Russian higher educational establishments, only nine were classified as universities; the rest were of the institute type. Moreover, even before the Revolution the majority of these institutes were under the jurisdictional auspices of various departments and ministries of the Imperial Government. It must be emphasized also that the roots of Soviet higher education—public, and not private— extend back over two centuries, as best exemplified by the history of engineering education. The Soviet regime inherited a government-run higher educational system and installed over it much more rigid, thorough and centralized control.

The origins of engineering education in the U.S.S.R. are commonly accepted as dating back to the 18th century, when Dutch, Scottish and German engineers were brought to Russia by Peter the Great to serve as chief instructors in the School of Mathematical and Navigational Sciences which he set up in Moscow in 1701.

[25] M. P. Kim, "Sovetskaia kul'tura" (Soviet Culture), in *Sovetskii Soiuz* (Soviet Union), Moscow, 1957, p. 206.

[26] N. DeWitt, "Scholarship in the Natural Sciences," in C. E. Black (ed.), *The Transformation of Russian Society: Aspects of Social Change since 1861*, Cambridge: Harvard University Press, 1960, pp. 385–405.

[27] B. B. Green, *University Autonomy and Soviet Totalitarian Control*, unpubl. Ph. D. thesis, Radcliffe College, 1959, *passim*.

[28] See table IV-4 below. The total number of regular higher educational establishments given there (696) includes the 40 Soviet universities already discussed.

[29] Not to be confused with *research* academies (see ch. V) or academies of the military establishment of the U.S.S.R.

[30] Note that the expressive and performing arts form also a specialized branch of the Soviet educational system. In 1959, for example, the U.S.S.R. had 22 separate higher educational establishments for musical education (largely conservatories); 126 music schools (*uchilishcha*), which are semiprofessional training establishments; and 1,200 music schools (*shkoly*) which taught instrument playing and vocal and choral art to both amateurs and professionals. See *Pravda*, Nov. 11, 1959.

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The Naval Academy and the Academy of Artillery, also established during Peter's reign, were Russia's main engineering schools until the first School of Mines was opened by Catherine the Great in 1773.[81] Other engineering schools were founded in the course of the 19th century, again primarily to serve the needs of various administrations (such as mines, railroads, communications and shipbuilding); and each school was placed under the administration of the appropriate department of the Imperial Government. Engineering programs were strongly influenced by the pattern set by the École Polytechnique of Paris, which offered strong theoretical and fundamental instruction in mathematics and the natural sciences. The majority of these Imperial higher education schools were centered in Moscow and St. Petersburg. In 1914, at the outbreak of the First World War, there were 16 independent higher education engineering schools—most were called "institutes"—with a total enrollment of about 21,000.[82]

The independence and separation of engineering education from universities and university natural sciences divisions are sometimes considered a peculiar development of the Soviet period, but it is clearly a phenomenon rooted in a tradition that is now over two centuries old. Already in pre-Revolutionary Russia there were separate pedagogical institutes for teachers, separate medical institutes for training physicians, and separate agricultural institutes—each operating apart from universities. This development was accelerated in the Soviet period, however, and affected most fields of professional specialization. Engineering education was administered by particular branches of industry. Medical, agricultural and pedagogical schools experienced much the same course of development, and they were administered by specific "commissariats" (i.e., departments) of the central government. Some had been in existence before the Revolution, but their numbers increased significantly under Soviet rule when similar university departments were detached from them and re-established as separate institutes. This proliferation of institutes was further intensified by the establishment in various localities of a number of genuinely new higher educational establishments, largely of the institute type. In 1913, for example, there were nine universities and 85 institute-type higher educational establishments; but in 1959 there were 40 universities and 656 regular institutes or similar establishments (not counting extension-correspondence and evening schools).

At the present time, Soviet institutes offer training in five branches of professional specialties: engineering-industrial, agricultural, socioeconomic, health and medicine, and education and cultural. Table IV–4 presents data on the number of higher educational establishments in the U.S.S.R. in 1959–60 (including the 40 universities) and their institutional grouping by specialty group and branch.[83] The branch and specialty group totals indicate the number of individual institutions within each branch. Some institutes have independent evening divisions, often located in nearby cities or otherwise separated from the main unit. In 1959 there were 49 such branch units. Soviet official sources usually report enrollments, admissions and graduations by branch and specialty groups, which are based on an institutional arrangement identical with that set forth in table IV–4. Therefore this grouping is indispensable in a definitional sense, for these designations by branch (and occasionally by specialty group) are employed throughout this study. It is to be noted also that in accordance with Soviet reporting practices, universities are counted among the "educational and cultural services" and are thus included in the grand total of Soviet higher educational establishments.

As already noted, the data in table IV–4 do not account for evening or extension-correspondence divisions of regular higher educational establishments unless they are *independent* units, physically separated from the parent institution. There were 49 such units in 1959. In addition, there were 23 entirely independent extension-correspondence higher educational establishments (all of them "institutes"), of

[81] A brief account of developments in early Russian engineering education may be found in S. P. Timoshenko, *Engineering Education in Russia*, New York: McGraw-Hill, 1959, pp. 1–9.

[82] "Higher Technical Education in the U.S.S.R.," U.S.S.R. section at the Universal and International Exhibition of Brussels, Brussels, 1958, p. 1.

[83] Data for other years, as well as a more refined breakdown by subdivisions within specialty groups, are found in appendix tables IV–C–2 and IV–C–3.

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TABLE IV–4.—*Soviet higher educational establishments by branch and specialty group as of 1959–60*

Branch and specialty group	Number of regular (day) higher educational establishments	Number of independent evening branches	Number of independent extension-correspondence institutes
A. Engineering-industrial, total in branch	176	48	15
1. Polytechnical and industrial institutes	29	21	3
2. Institutes of power and electrical engineering, radio engineering and engineering physics	7	.....	1
3. Institutes of machine building, shipbuilding, aviation engineering, printing-publishing and cinema engineering	28	6	2
4. Geological, mining, petroleum, peat and metallurgical institutes	27	16	1
5. Institutes of chemical technology	10	1	1
6. Food technology and fisheries institutes	11	.....	2
7. Institutes of light industry	7	2	1
8. Construction, geodesy and road building institutes	28	2	2
9. Institutes of hydrometeorology	2	.....	.....
10. Transportation and communication institutes	27	.....	2
B. Agricultural, total in branch	107	.....	2
11. Agricultural and forestry institutes	107	.....	2
C. Socioeconomic, total in branch	25	.....	3
12. Economics (management) institutes	22	.....	2
13. Institutes of jurisprudence	3	.....	1
D. Health and medicine, total in branch	95	.....	.....
14. Higher medical institutes	80	.....	.....
15. Higher educational institutes of physical culture	15	.....	.....
E. Educational and cultural services, total in branch	293	1	3
16. Universities	40	1	.....
17. Pedagogical, library, historical-archive and literature institutes	206	.....	3
18. Institutes of art	47	.....	.....
Grand total	696	49	23

Source: *Sprav VUZ–1959, passim*; appendix table IV–C–2.

which 15 were of national significance: the "all-union" (*vsesoiuznyi*) type. Each of these 15 had branch offices in different localities.

It is obvious from the table that the functional grouping of Soviet higher educational establishments, and of their students and graduates, is different from the grouping by field of study commonly used in American reporting.[84] Nevertheless, a numerical comparison of graduates, enrollments and admissions by branch (aggregation of fields of study in the United States and training specialties in the U.S.S.R.) can usually be made in approximate terms.

As with universities, Soviet institutes are divided into divisions (*fakul'tety*) and teaching departments (*kafedry*). The total number of the types of divisions in Soviet institutes in 1959–60 was 214[85] (plus 35 types of university divisions and an unknown number in pedagogi-

[84] In this regard, see the annual circulars of the U.S. Department of Health, Education, and Welfare, Office of Education. In the United States some 75 fields of study, grouped into about 20 branches, are distinguished. In some applied fields the U.S. grouping resembles the Soviet classification of specialties.

[85] For a detailed listing, see appendix IV–B–2.

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cal and expressive art institutes). Their grouping by branch and specialty group is summarized in table IV–5. The total number of institute

TABLE IV–5.—*Number of types of divisions in Soviet higher educational establishments by branch and specialty group as of 1959–60*

Branch and specialty group	Number of types of divisions
A. Engineering higher educational establishments, total	184
II. Polytechnical and industrial institutes	57
III. Institutes of power and electrical engineering, radio engineering and engineering physics	13
IV. Institutes of machine building, shipbuilding, aviation engineering, printing-publishing and cinema engineering	30
V. Geological, mining, petroleum, peat and metallurgical institutes	10
VI. Institutes of chemical technology	9
VII. Food technology and fisheries institutes	7
VIII. Institutes of light industry	2
IX. Construction, geodesy and road building institutes	14
X. Institutes of hydrometeorology	2
XI. Transportation and communication institutes	15
B. Agricultural higher educational establishment, total	4
XII. Agricultural and forestry institutes	4
C. Socioeconomic higher educational establishments, total	21
XIII. Engineering-economics (management) institutes	21
D. Educational-cultural higher educational establishments, total	35
I. Universities, total	35
A. Mathematics and natural sciences	21
B. Humanities and social sciences	14
XV. Pedagogical and art institutes *	A few
E. Health-medical higher educational establishments, total	*5
XIV. Medical, health and physical culture institutes	*5
Total	249

* The official directories do not list the divisions of higher educational establishments in groups XIV and XV.

Source: Appendix IV–B–2. The roman numerals in the table above are in the sequence adapted in the listing of divisions in appendix IV–B–2 and the institutional directory in appendix IV–B–3 in which universities appear first, and the health and education branches are given in inverse order.

divisions is estimated to be about 2,800–3,000.[36] The largest institutes have up to eight divisions, but most have only three or four. Each division consists of several teaching departments, ranging from five to fifteen in number. In some institutes there is an intermediate subdivision (*otdelenie*), which consists of several departments. The term "subdivision" is also used to designate various types of institute programs, such as evening branch (*vechernee otdelenie*) or extension-correspondence branch (*zaochnoe otdelenie*). In 1959 the average institute had an enrollment of about 2,900 students in all categories, of which about 1,550 were full-time (day) division students. The majority of evening and extension-correspondence students are enrolled in the respective branches of regular institutions, and there are only about 50 institutes which do not have evening and/or extension-correspondence divisions. There are many small institutes, with enrollments of under 1,000 students, but there are a number of institutes, primarily in the engineering fields, where the regular (day) enrollment is anywhere from 4,000 to 8,000. The average enrollment of institutes has grown steadily: 1940—734; 1950—994; 1958—1,550 regular (day) students.[37] By size of average enrollment, institutes in the engineering fields are usually the largest, followed by medical, agricultural and pedagogical institutes.

Today, after a number of changes in the last three decades, the length of training in institutes is usually from 4 to 6 years. In the early 1930's a drastic reduction in the length of training took place, in some instances to 2 years. Prior to 1929 and after 1933, the length of training in most institutes was at least 4 years. At the present time the length of training in engineering-industrial institutes is 5 to 5½ years; in agricultural institutes, 4 years and 7 months to 5 years; in medical institutes, 6 years; in pedagogical and cultural-service institutes, 4 to

[36] Some institutes do not officially report the number of divisions.

[37] *VVSh*, No. 4, April 1951, pp. 7–9; *Medynskii–1952*, pp. 166–67. The average size of enrollment was derived on the basis of the number of institutions and total enrollment. This was verified for some individual institutes. Appendix IV–B–3 gives figures on enrollments and graduations for a number of individual higher educational establishments for recent years.

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5 years.[38] Prior to 1955 some teacher institutes training primary school teachers offered 2-year courses; but all but one of these teacher institutes were abolished recently or incorporated with pedagogical institutes. The 4-year program of pedagogical institutes is currently being converted into a 5-year program.

Other changes are now taking place or are being projected. Among the most recent developments in institute education, for example, has been the introduction, as in the universities, of differentiated requirements for admission. A campaign to consolidate some institutes into larger units has so far resulted in only a few such moves. Also, determination of the proper geographic location of institutes has repeatedly been under consideration; some institutes recently were actually transferred to new locations. The campaign to establish a closer link between institute education and production has brought about many recent changes in the organization of instruction programs and the industrial practice requirement. Finally, the creation of a new type of institute, called "factory higher technical educational establishment" (*Zavod VTUZ*), in which students of a given economic enterprise study and work, was announced recently; several such institutes (in Magnitogorsk, for example) have already been set up. (See further discussion below.)

3. *Other Types of Higher Educational Establishments*[39]

It is of historic interest that during the period when industrialization was most urgent, especially in the late 1920's and early 1930's, two types of educational establishments were prominent—the Higher Party Schools (*Kom VUZ*) and the Higher Communist Agricultural Schools (*VKSKhSh*). (Both were considered higher educational establishments before their ultimate abolition in the late 1930's.) During the 1930's they trained some 60,000 specialists, most of whom eventually became industry managers and government administrators. The professional training they received, however, was considerably below the standards usual in regular higher educational establishments of that period.

In the early 1930's a special substitute for higher education were "special purpose faculties" (or divisions) (*FON—Fakul'tet Osobogo Naznacheniia*), which offered tutorial training to managerial and party personnel.[40] After about 6 years of existence these special-purpose faculties were reorganized into agricultural and industrial academies (*sel'skokhoziaistvennye i promyshlennye akademii*), which trained specialists, again primarily for managerial and high administrative positions. Many of these academies were closed shortly after the "great purges" of 1937–38, but a few still remain, especially in the agricultural field (the Moscow Timiriazev Agricultural Academy, the Leningrad Academy of Forestry, and several industrial managerial academies); some of these academies (e.g., the Leningrad Academy of Forestry) are now regarded as bona fide higher educational establishments of the institute type. Graduates are certified as having completed higher education and are classified in official statistics as specialists within a given professional field of training. In the past the training received by academy graduates—only 1,000–2,000 per year—appears to have been considerably inferior in quality to training offered by regular higher educational establishments. This is not universally the case, however; the quality of training provided by the Timiriazev Agricultural Academy in Moscow, for example, is not much different from that offered in regular agricultural institutes.

In addition to these higher educational establishments, there has been in operation a variety of so-called closed-access (*zakrytye*) higher educational institutions of the military establishment of the U.S.S.R. and of the Communist Party. Little is known about these schools, particularly as far as their entrance requirements,

[38] The 1959 and 1960 reorganization of instruction programs has added 6 months to the length of some training programs. See discussion on programs and curricula below.

[39] This section will deal with Soviet institutions of higher learning which usually receive little attention. They are often deliberately passed over in Soviet sources, because of their unique and salient role.

[40] Outside the Soviet Union, very little is known about this interesting educational experiment. Some references can be found in Beilin, *Kadry*, p. 330, and *passim;* and in an interesting account: "Faculties of Special Purpose," unpublished manuscript, in English, New York: Research Program on the U.S.S.R., subsequently published in revised form in G. L. Kline (ed.), *Soviet Education*, New York: Columbia University Press, 1957.

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programs or courses offered and fields of specialization are concerned. A Soviet source reported a few years ago that in 1939 there were 16 military academies in the U.S.S.R.;[41] one Western compilation identified 14 in the postwar period.[42] In 1940 there were 18 military academies; the number is not believed to have increased since then. (There are in addition several police academies.) But whatever the actual number, these academies, though considered individual units, are in fact multi-branch establishments. A Moscow-based military academy, for example, might have several branch units—or indeed as many as 20 or 30 branch units—in other localities. Training in military academies lasts from 5 to 6 years. It is also known that the Soviet military operate "special divisions" (*spetsial'nye fakul'tety*) in regular civilian higher educational establishments, which provide training for military personnel. In 1939 six such divisions were mentioned; and in 1947 seven such divisions and one "Leningrad Red Banner Military-Mechanical Institute" could be identified.[43] How many "special divisions" there are at the present time is uncertain, for their existence is camouflaged under such innocuous classifications as "mechanical division" or simply "design division."

The importance of the higher educational institutions of the military establishment of the U.S.S.R. stems from the fact that contrary to military education practices in most Western countries, including the United States, the majority of Soviet military academies offer professional training in such fields as engineering, chemistry and medicine, for service in the military establishment, and do not train exclusively command and staff officers. In all likelihood these military-engineering academies (Dzerzhinskii Artillery, Zhukovskii Aviation Engineering, Budenyi Electrical Engineering and Communications, Voroshilov Chemical Warfare, Armaments Industry and others) offer not only comparable, but perhaps even superior professional training as compared with civilian engineering institutes. In a real sense, these are not only "military" establishments, but institutions for the training of professionals in the armed forces of the U.S.S.R., who conduct military research and development, and direct and supervise the design, development and procurement of weapons and military equipment.

The numerous military officers' schools (*uchilishcha*) which offer military and technical training are often overlooked in appraisals of the Soviet higher educational system. These are sometimes regarded as higher educational establishments, but the actual level of training in these establishments is cloaked in uncertainty. For example, the *VVAUL* (*Vysshee Voennoe Aviatsionnoe Uchilishche Letchikov*—Higher Military Aviation School for Pilots) in Eisk (in the North Caucasus) and Kachinskoe (near Stalingrad), or the *VVAUSh* (*Vysshee Voennoe Aviatsionnoe Uchilishche Shturmanov*—Higher Military Aviation School for Navigators) in Orenburg, and scores of similar institutions in other branches of the military service are known to grant, after up to 5 years of training, a certificate of higher education as well as an officer's commission.[44] In the prewar period between 2,000 and 3,000 persons graduated from military academies every year. The number of graduates from other military or police schools cannot be ascertained.

Many of the military engineering-technical, medical and other personnel thus trained, even though committed to life-time military careers, may eventually be transferred to civilian employment.[45] This has an important implication in any appraisal of the professional resources

[41] *BSE-SSSR—1957*, p. 424.

[42] Korol, *Soviet Education*, p. 141. Most of the academies listed are from *VyShkoSPR—1945*, p. 250. See Supplement to appendix IV–B–3.

[43] *Sprav VUZ—1947, passim.* "Special divisions" were operating at the Bauman Higher Technical School (which had several such divisions), the Tula Mechanical Institute, Cheliabinsk Mechanical-Machine Building Institute, Kazan', Moscow and Leningrad Chemical Technology Institutes, and the Leningrad Shipbuilding Institute, which had a "maritime division" for the "design, production and testing of special armaments." In subsequent years (*Sprav VUZ—1954* and *Sprav VUZ—1959, passim*), some of these special divisions were identified cryptically only as "mechanical," "machine building," "engineering chemical technology," or simply "design" divisions. None of these divisions ever lists the specialties of training. For a number of years aviation institutes (most of which also had special divisions) did not list any specialties either.

[44] See *Komsomol'skaia pravda*, July 9, 1959.

[45] The 1958–59 cuts in the Soviet active armed services were supported by legislative regulations concerning the absorption of military personnel into the civilian economy (*Pravda*, Jan. 26, 1960). These regulations made it evident that some military personnel (officers) are employed in civilian jobs in peacetime as well as wartime (col. 3, par. 10 of the decree).

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of the U.S.S.R., which may be substantially underestimated by not counting the many thousands of Soviet citizens trained annually in military higher educational establishments. It is believed that the annual graduations reported by Soviet sources as a rule exclude graduates of military establishments. It has been estimated that in 1959 approximately 350,000 higher education graduates were in the military establishment of the U.S.S.R.[46] How many of these graduates were specifically trained within the military establishment is impossible to determine. Undoubtedly some of these professionals were recruited from the stock of graduates of civilian higher educational establishments. But what this proportion is, again, is difficult to guess. It is this resource of professional, mostly technically trained manpower within the military establishment, that the Soviet Government has in recent years been attempting to release, at least in part, to the civilian economy by means of temporary reductions in military personnel strength.

The training establishments of the Communist Party are another unexplored area. In the 10 postwar years (1946–56) party schools on the local and regional level are officially reported to have trained 55,000 persons, of whom 8,843 persons completed the *VPSh* (*Vysshaia Partiinaia Shkola*—Higher Party School).[47] Most of these graduates are employed in leading positions of the Communist Party as well as in governmental posts and economic administrations of the U.S.S.R. Graduation from local or regional party schools in the past was considered the equivalent of a 2-year higher education course in a teachers' institute. Graduation from the *VPSh* was regarded as equivalent to university education.

In 1956 the Communist Party instituted several changes in its educational facilities.[48] A number of the 3-year local-regional party schools were converted into 4-year institutions, which offer "higher party–political education" and award higher education graduation diplomas. These schools are classified as "higher educational establishments of the second category."[49] There are 30 such *MPSh* (*Mezhoblastnye Partiinye Shkoly*—interregional party schools) in the U.S.S.R. Of these, seven have separate branches for the training of "newspaper personnel," for the most part editors of the Soviet press, as well as other mass communication media.[50] Thirteen party schools offer a 3-year course of training.[51]

The curriculum and programs of study in *MPSh* are prepared by the Higher Party School (*VPSh*).[52] Students of party schools receive a "stipend" ranging from 1,000 to 1,700 rubles per month (three to seven times the amount received by students in regular higher education), plus 100 rubles per month for each dependent. Admission to party schools is by competitive examination, and is limited to secondary-education graduates proposed by the regional or all-union offices of the party. Official statistics on annual enrollment are not available, but on the basis of aggregate graduation figures for 1946–56, an annual enrollment figure of 20,000 to 25,000 can be considered probable.

The Higher Party School (*VPSh*) is located in Moscow, but maintains branches in many major cities. Most of the capitals of the 14 other union republics have similar schools directly subordinate to the central committees of the union-republic Communist Party organizations. The *VPSh* of the Central Committee of the CPSU offers a 2-year "regular" program, and a 5-year program in its extension-correspondence division (*ZVPSh*). The *VPSh* and

[46] See ch. VI.

[47] Malin, *op. cit.*, p. 410. Of the *VPSh* graduates, 6,000 received their training in extension-correspondence programs.

[48] *Ibid.*, pp. 411–15.

[49] *Ibid.*, p. 411. Second-category higher educational establishments are schools *not* listed among the 85 top-priority higher educational establishments originally so designated in 1943 for purposes of determining military draft exemptions. These 85 institutions have subsequently been mentioned on various occasions as preferential-status higher educational establishments. The exact number of higher educational establishments listed at the present time in the first or the second category is not certain.

[50] It should be noted that the university specialty of journalism (see specialty code 2027, appendix IV–B–1) accepts only applicants who are Communist Party members or who have been specifically recommended by the regional offices of the Komsomol for this type of training. The editorial offices of all Soviet newspapers and magazines are staffed by Communist Party members, who must receive party clearance to hold such jobs.

[51] In 1956, 24 three-year party schools were directed to discontinue enrolling new students and dissolve by 1959. Whether all of these schools were actually closed is doubtful, for there are occasional references in the Soviet press which indicate that in some of the affected cities the party schools are still in operation.

[52] See program of study in the 4-year *MPSh* in appendix tables IV–B–21A and IV–B–21B, and discussion below.

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its *ZVPSh* division accept only persons with *completed* higher education (regular civilian, party or military). Training is designed to prepare "leading party personnel for work on the union-republic and regional level" of the party apparatus. Selected by "party assignment," students are required to have had "extensive experience in responsible party work." [53] The *VPSh* operates also a 3-year division for foreign party personnel selected for training by their own party organizations. Admissions in 1956 to the regular program of the *VPSh* numbered 200 and to the extension-correspondence division, 3,000.

In addition to the institutions discussed above, the Communist Party of the Soviet Union maintains many schools of various types for the training of agitators, propagandists, party instructors, and junior leaders. In general, the party schools train future party functionaries, who may, however, be eventually assigned to leading positions in the governmental and economic administration of the Soviet state.

This discussion has already suggested that there are many variations in the programs of Soviet higher educational establishments, and that the meaning of the term "higher education" embraces a wide diversity of training. It is, however, the regular higher educational establishments—universities and institutes—that are most significant as suppliers of professional manpower.

Administrative Subordination of Soviet Higher Educational Establishments

The general administrative organization of Soviet education has already been discussed in chapter I, where it was noted that the overall direction and planning of Soviet higher education is exercised by the Ministry of Higher and Secondary Specialized Education of the U.S.S.R. It was also noted that in the past, the actual day-to-day operation of individual higher educational establishments was subordinated to various other ministries.

In the 1950's the Ministry of Higher Education of the U.S.S.R. reported the proportions of the higher education enrollment under its immediate control, as indicated in table IV–6.[54] The height of consolidation of direct control was reached in 1954, when higher education was for a short period administered by a division of the Ministry of Culture. In 1955 the reestablished U.S.S.R. Ministry of Higher Education was split when a union-republic ministry of higher education was set up in the Ukrainian SSR. These shifts accounted for a drop of institutions and students under the direct control of the U.S.S.R. Ministry of Higher Education.

TABLE IV–6.—*Total enrollment in Soviet higher education and proportion under the jurisdiction of the Ministry of Higher Education, 1951–56*

Year	Total enrollment (thousands)	Enrollment under the Ministry of Higher Education (thousands)	Percent under the direct jurisdiction of the Ministry of Higher Education
1951.....	1,356.1	555.1	40.7
1952.....	1,441.5	619.5	43.0
1953.....	1,562.0	686.1	42.9
1954.....	1,730.5	787.2	45.0
1955.....	1,867.0	745.7	39.8
1956.....	2,001.0	666.3	33.3

Source: Komarov, *Ekonomicheskie osnovy*, p. 135.

Table IV–7 provides data on the institutional jurisdiction over Soviet higher educational establishments as of January 1959. Out of 719 institutions of higher learning, over one-third (243 institutions) were under the direct operational control of the U.S.S.R. Ministry of Higher Education. The remaining two-thirds were subordinated to various ministries and administrations, among which the Ministry of Agriculture of the U.S.S.R., the ministries of education and the ministries of health of the union republics were the most significant.

Recent indications are that the operation and administration of all institutions of the Ministry of Higher and Secondary Specialized Education (so renamed in July 1959) will soon be transferred to union-republic administration

[53] Malin, *op. cit.*, p. 413.

[54] In the 1930's most higher educational establishments were under the control of various economic commissariats.

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TABLE IV–7.—*Institutional jurisdiction of Soviet higher educational establishments as of January 1959*

Ministerial jurisdiction	Number of higher educational establishments
Ministries of Higher Education	**243**
Ministry of Higher Education, U.S.S.R.	196
Ministry of Higher Education, Ukrainian SSR	47
All-Union or Union-Republic Ministries of U.S.S.R.	**130**
Ministry of Agriculture, U.S.S.R.	99
Ministry of Railway Transport, U.S.S.R.	14
Ministry of Maritime Fleet, U.S.S.R.	4
Main Administration of Civil Aviation of the Council of Ministers of the U.S.S.R.	1
Ministry of Communications, U.S.S.R.	7
Ministry of Trade, U.S.S.R.	5
Ministries of Education	**205**
RSFSR 103	Georgian SSR 9	Kirgiz SSR 4
Ukrainian SSR 35	Azerbaidzhan SSR 5	Tadzhik SSR 3
Belorussian SSR 7	Lithuanian SSR 3	Armenian SSR 3
Uzbek SSR 12	Moldavian SSR 2	Turkmenian SSR 3
Kazakh SSR 12	Latvian SSR 3	Estonian SSR 1
Ministries of Health •	**80**
U.S.S.R. 1	Kazakh SSR 4	Latvian SSR 1
RSFSR 46	Georgian SSR 1	Kirgiz SSR 1
Ukrainian SSR 14	Azerbaidshan SSR 1	Tadzhik SSR 1
Belorussian SSR 2	Lithuanian SSR 1	Armenian SSR 1
Uzbek SSR 4	Moldavian SSR 1	Turkmenian SSR 1
Ministries of Culture	**38**
U.S.S.R. 2	Kazakh SSR 1	Moldavian SSR 1
RSFSR 12	Georgian SSR 3	Latvian SSR 2
Ukrainian SSR 5	Azerbaidzhan SSR 2	Armenian SSR 2
Belorussian SSR 2	Lithuanian SSR 2	Estonian SSR 2
Uzbek SSR 2		
Commissions on Physical Culture and Sports of the Council of Ministers	**15**
U.S.S.R. 1	Uzbek SSR 1	Lithuanian SSR 1
RSFSR 3	Kazakh SSR 1	Latvian SSR 1
Ukrainian SSR 2	Georgian SSR 1	Kirgiz SSR 1
Belorussian SSR 1	Azerbaidzhan SSR 1	Armenian SSR 1
Miscellaneous Administrations	**8**
Ministry of Communal and Urban Services, RSFSR	1
Ministry of River Fleet, RSFSR	3
All-Union Producer's Cooperative Association (*Tsentrosoiuz*)	2
City Executive Council (*Gorispolkom*), Moscow	1
Union of Soviet Writers	1
Total	**719**

• In the Estonian SSR medical education is offered at Tartu University.
Source: *Sprav VUZ–1959, passim.*

(ministries or state committees).[55] Some of these republic administrations will also take over the operational control of higher educational establishments which were originally under other ministerial auspices (agriculture, education, health, etc.) and are located on the territory of the given republic. In fact, Soviet higher education officials insist that administratively all higher and secondary specialized educational establishments will eventually be subordinated to "territorial" (i.e., province, region or republic) administrations. Meanwhile, all of the approximately 25 higher educational establishments of the Kazakh SSR appear already to be under republican state committee administration. In some of the other republics the transfer of medical and educational institutes is considered likely in the future. Indeed, a *geographic* pattern of operation and management of Soviet higher education

[55] Reported by the first Deputy Minister of Higher and Secondary Specialized Education of the U.S.S.R., M. A. Prokofiev, who visited the United States in March 1960. Mr. Prokofiev is also head of the Foreign Affairs Section of the Ministry.

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appears to be in the process of replacing control of the functional ministry type. However, all questions of specialization, curricula and syllabi, as well as all matters of enrollment and admission quotas (by branch and specialty), and the placement of graduates, will, as in the past, be handled by the U.S.S.R. Ministry of Higher and Secondary Specialized Education.

This Ministry is reported to have at present the following major divisions supervising the instruction programs and course contents in: (1) universities, and economic and polytechnical higher educational establishments, and (2) all other specialty branch (*otraslevye*) institutes. This new structure constitutes a reorganization of the chief administrations which existed in the past. The newly established divisions will no longer administer directly the operation of higher educational establishments, but will deal with curricular matters, the planning of enrollments, and placement of graduates on the inter-republic level. Other major divisions of the Ministry will deal with instructional and methodological problems, as well as plan the training and placement of semiprofessional school graduates. As in the past,[56] the Ministry of Higher and Secondary Specialized Education will have about ten functional units, such as personnel, accounting, planning, *Giprovuz* (design of higher education facilities) and library. And again, as in the past, attached to this Ministry will be the Supreme Attestation Commission (*VAK*), which handles the certification of all academic-rank and advanced-degree personnel. The Ministry will also continue to publish journals (*VVSh, SSO*) and run its own publishing house (*Sovetskaia Nauka*) for texts, programs and instructional materials. The independent foreign affairs section will continue to deal with the selection and supervision of foreign students in the U.S.S.R. and handle exchanges with foreign countries.

[56] *VyShkoSPR—1957*, p. 18, gives the structure of the Ministry of Higher Education as of 1956. An English translation of this important compilation may be purchased from the Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C. The 1956 structure is not reproduced in this study, for it has been rendered out-of-date by the current reorganization.

Fields of Study, Specialties and Specialization in Soviet Higher Education

In the Soviet Union, as elsewhere, students are educated in diverse fields of study. The student's field of study in higher education is designated by the term "specialty" (*spetsial'nost'*). All students acquire a specialty as a result of higher education study. This applies to any field of knowledge, be it science, engineering, literature, the fine arts, ballet, school teaching or medicine. *No* higher educational establishment in the U.S.S.R. offers nonspecialized professional instruction such as the general studies or liberal arts programs common in American colleges and universities, and only professional education in some particular specialty is available. The Soviet student chooses his specialty at the time he enters higher education, then embarks on a well-defined program which he must complete in order to qualify as a "specialist" in the narrow occupational meaning of the term. "Specialization" in the U.S.S.R., therefore, has considerably narrower meaning than in American professional education; it entails training in an individual, narrowly defined field of professional knowledge, which will equip the student to perform a given occupational job. Professional specialization in the Soviet Union is much more pronounced than anywhere else in the world.

The Soviet philosophy of higher education is firmly rooted in the conviction that man is destined to perform a specific task in society. Those who advance into higher education, therefore, must become specialists so that they may make maximum use of their capabilities. Specialization is often said to beget specialization, but this formula is verified only in part by the Soviet process of alternately intensifying and relaxing specialization. Whenever economic necessity requires it, specialization has been intensified, and each such phase has been followed by a period of consolidation and relaxation. In the past the educational base was small and there was an abundant demand for specialists of all types. In recent years, with a substantial increase in the supply of professionals, there has been a steady trend to ease exceedingly narrow specialization which had proved a handicap in the placement and utilization of

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graduates. Despite the degree of emphasis, however, specialization continues to be a dominant feature of Soviet higher education.

The system of institutional classification of specialties and subspecialties in practice prior to 1954 [57] resulted in a complex of some 900 different fields of training. To do away with this excessive fragmentation of professional education, the Soviet Government in the fall of 1954 decreed [58] the development of a system of aggregative specialties, to be put into effect in the academic year 1955–56, and subject to amendment only by the Ministry of Higher Education with the concurrent agreement of the State Planning Committee. As a result, Soviet higher education as of mid-1959 offered professional education in 346 specialties, a full listing of which is given in appendix IV–B–1. Associated with each specialty is a specific curriculum, each course of which follows a predetermined line of progress guided by a syllabus and selected instructional content, textbooks, laboratory work and study assignments. A decimal code system introduced at the same time greatly simplified the classification and placement of students and graduates, and streamlined procedures for revising specialties when the need arose. Only as a rare exception was narrow specialization within a specialty permitted.

Table IV–8 illustrates the pattern of distribution of specialties in Soviet higher education. The respective levels of aggregation may be summarized as follows:

Specialty (spetsial'nost').—In 1959 there were 346 specialties in Soviet higher education, identifiable by a 4-digit decimal classification code (from 0100 to 2299). In the 719 Soviet higher educational establishments a total of 3,676 specialty offerings were available in the regular (day) program of study, and a total of 362 offerings in the independent evening and extension-correspondence divisions or institutes. These figures represent the total number of training programs in all higher educational establishments. Obviously, the same program of study could be offered in more than one institution. However, an average of five or six specialties (programs) were offered in each higher educational establishment. There was great variation in this, however: some institutions offered over 20 specialties, while others offered only two or three. It should be emphasized that in evening and extension-correspondence programs, specialty offerings were counted only if the division was a *separate* unit.

Specialty group (grupovaia spetsial'nost').—Each of the 22 specialty groups contained a number of individual specialties, ranging from 2 (jurisprudence) to 43 (pedagogical) in a group. The number of offerings in each specialty group varied widely. Most of the specialty groups (15), with the largest proportion of specialties (181), were to be found in the engineering and industrial fields of study.

Branch (otrasl'). Specialty groups (and the individual specialties therein) were classified under five branches of study: (I) engineering-industrial, (II) agricultural, (III) socioeconomic, (IV) medical and health, and (V) educational-cultural services. Notably, specialties offered in universities were classified in a specialty group (university specialties) included in the educational-cultural services branch.

These three levels of aggregation—specialty, specialty group, and branch of study—are extremely important, for Soviet sources usually report educational and professional employment data in relation to these levels. Parenthetically, specialty groups and branches coincide to a large extent with the institutional grouping discussed above (i.e., table IV–4). They are not, however, identical; if a university offers training in medicine, engineering or jurisprudence, as universities sometimes do, the reporting of enrollment and graduates, as well as the appropriate program of instruction, will appear not under universities, but in the appropriate specialty group. Appendix IV–B–1 presents information on each individual specialty in terms of the kind of institution where it was offered in 1959 (or the specific institution, where such information was available).

In processing specialties by institutional grouping, it was observed that (1) individual specialties or specialty groups are not necessarily offered in those higher educational establishments designated in the corresponding groups by institutional arrangement; but (2) only on rare occasions were individual specialties or specialty groups offered by institutions which were categorized under branches other than those designated by the institutional grouping.

This can best be illustrated by taking specific examples.[59] The mechanical engineering special-

[57] See details in *SPM*, pp. 106–09; I. Liasnikov, *Podgotovka spetsialistov promyshlennosti SSSR* (Training of Specialists for Industry in the U.S.S.R.), Moscow, 1954, p. 89; *VVSh*, No. 5, May 1954, p. 48, No. 9, September 1954, p. 6.

[58] *VyShkoSPR—1957*, pp. 55–59.

[59] Many other examples could be constructed from the information in appendices IV–B–1 and IV–B–3.

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TABLE IV–8.—*Number of offerings by specialty groups in Soviet higher educational establishments as of January 1959*

Specialty code	Number of known specialties	Branch and Specialty Groups	Number of offerings	
			Full-time day	Extension-correspondence and evening
	181	I. Engineering and other industrial field specialties, total	1,469	293
0100	8	Geology and exploration of mineral deposits	87	6
0200	6	Exploitation of mineral deposits	71	17
0300	10	Power engineering	123	31
0400	8	Metallurgy	83	29
0500	38	Machine building and instrument construction	323	102
0600	21	Electrical machine building and electrical instrument construction	133	13
0700	12	Radio engineering and communications	73	9
0800	16	Chemical technology engineering	131	22
0900	4	Timber engineering and technology of wood processing, cellulose, and paper manufacturing	32	3
1000	13	Technology of food products industry	57	11
1100	9	Technology of consumers' goods industry	44	13
1200	15	Construction	219	34
1300	4	Geodesy and cartography	16	none
1400	5	Hydrology and meteorology	20	none
1600	12	Transportation	57	3
	12	II. Agriculture and forestry, total	305	6
1500	12	Agriculture and forestry	305	6
	41	III. Socioeconomic specialties, total	204	35
1700	39	Economics	180	34
1800	2	Jurisprudence	24	1
	6	IV. Medical and health specialties, total	154	none
1900	6	Public health, medicine and physical culture	154	none
	106	V. Education, pure (theoretical) sciences, cultural services, arts and entertainment field specialties, total	1,544	28
2000	32	University specialties	414	3
2100	43	Specialties in pedagogical and library institutes	869	25
2200	31	Arts and entertainment	261	none
	346	Grand total	3,676	362

Source: Compiled from data in appendix IV–B–1.

ty "gyroscopic instruments, devices and systems" (Specialty 0609) is classified in the specialty group 0600—"electrical machine building and electrical instrument construction." There are a total of eight offerings of this specialty, five of which are given in institutes of the appropriate institutional grouping—"Institutes of Machine Building, Ship Building, Aviation Engineering, Printing, Publishing and Cinema Engineering" —category IV. One offering is found, however, in the (Saratov) Higher Engineering Automotive Institute (institutional category IX).[60] Another is found in the (Leningrad) Electrical Engineering Institute, which belongs to institutional category III—Institutes of Power and Electrical Engineering. Yet clearly all seven of these offerings fall within the engineering branch by either the specialty grouping or the institutional grouping. The eighth offering of Specialty 0609, however, is given in Saratov State University,

[60] Apparently because one of the precision instrument plants is located in Saratov.

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which is classified under institutional category I —universities—and thus belongs under the branch "educational and cultural service higher educational establishments."

To take another example, the mining engineering specialty "exploitation of mineral deposits" (Specialty 0202) is offered in 17 different institutes in institutional category V, "Geological, Mining, Petroleum, Peat and Metallurgical Institutes," and in 9 institutes in institutional category II, "Polytechnical and Industrial Institutes." Both of these obviously fall within the "engineering-industrial branch" according to either the specialty grouping or the institutional grouping. However, one offering of Specialty 0202 is given in Irkutsk State University, which as a university is classified under "educational and cultural services" according to the institutional grouping.

Specialty 1901 in medicine (for training physicians) is offered largely in medical institutes, institutional category XIV. However, it is offered also in four universities and in one polytechnical institute (in Vladivostok). Obviously the institutional and specialty groupings will not coincide in this case. This is an exceptional case, the result of the geographical remoteness of Vladivostok, where medical training is offered by a polytechnical institute; but it illustrates the point very well, for in an institutional grouping the medical students and graduates of the Vladivostok Polytechnical Institute would be classified in the "engineering-industrial branch," but in the specialty grouping in the proper "health-medicine branch."

Thus, with only minor exceptions the classification of specialties by branch differs little from the classification of institutions by branch. Within the branch, however, specialty groups are not necessarily coincident with the corresponding institutional groups. Particularly in the engineering fields, the institutional grouping of individual higher educational establishments does not always coincide with the specialty groups composed of individual specialties. This is an annoying but important consideration, for although the enrollment and graduation data are relatively well delineated as between branches, and one does not have to be particularly concerned in examining aggregate data as to whether they are based on "institutional" or "specialty" grouping, within each branch, however, the "specialty groups" do not always coincide with the "institutional groups." [61]

Availability of individual specialty training varies widely throughout the Soviet Union. Thus Moscow, where 40,000 graduate annually, is not only the largest seat of higher education, but also the center of highest diversification, with training available in some 250 different specialties.[62] By comparison, only three to five specialties are available in some provincial towns with only one institute. Thus, by and large, diversity of higher education outside the large cities is very limited. As a result of the consolidation of specialties and the demand for diversity, small, "one-specialty" higher educational establishments in the provinces as well as in the cities are being merged into larger units.[63] The Soviet Government appears to be favoring larger higher education units with a multiplicity of specialty programs of instruction even though consolidation means the removal of institutions of higher education from some localities. To enhance diversification, the educational reform has outlined a program for the creation of regional universities which will offer instruction in such fields as engineering, medicine and agriculture, not commonly offered in universities at the present time.

Since it is, of course, beyond the scope of this report to deal with every one of the specialties, discussion must be limited to the larger aggregates, primarily on the branch level. The very number of specialties in Soviet engineering education reflects the continual narrowing and redivision of traditional engineering training. Thus mechanical engineeering is broken down into several dozen related but perilously narrow specialties such as mechanical engineering in agricultural machinery, in machine tools, in casting equipment, in automobiles, in tractors and in aircraft engines. There are training programs for metallurgical engineering specialists in copper and alloys, in lightweight metals or in ferrous metallurgy; for mining engineering specialists in the drilling of petroleum and gas wells or in the exploration of coal deposits; for

[61] For further discussion, see section on graduations below, where specialty groups by branch are compared with institutional reporting by branch, tables IV–47 and IV–48.
[62] *Sovetskaia Estonia*, Oct. 20, 1957.
[63] *Turkmenskaia iskra*, Feb. 11, 1959.

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civil engineering specialists in bridge design, in building large-scale hydrotechnical structures or in erecting industrial buildings. This fragmentation is characteristic of every field of engineering.

Ever since the advent of such narrow specialization in the 1930's, Soviet educational authorities have sought by decrees, regulations and discussion to arrest the excessive division of fields of study. These efforts were largely ineffective against the contention that fragmentary specialization (*drobnaia spetsializatsiia*) was necessary if the immediate needs of industry for specialized engineering graduates were to be met. After a prolonged airing of the matter in 1952-54, a final decree was issued in 1954—as already noted—reversing the trend toward ever narrower specialization.

Although most of the minute specializations have been eliminated, the number of specialties has actually increased (1953—295; 1959—346).[64] This phenomenon is a reflection of the functional orientation of Soviet higher education if not its complete subordination to applied professional pursuits within each occupation. But despite this formidable proliferation of specialties, what the students are taught in each instruction program can still be ascertained with reasonable reliability. This, of course, is extremely difficult in American college education with its system of electives and uncertain rules of accreditation. This is not to say that what the student actually learns is widely different in the two countries. It does mean, however, that what is being taught in the U.S.S.R. in a given specialty can be compared only with a *similar* type of program in one specific educational institution in the United States. It is primarily for this reason that comparisons of the quality of professional education in the two countries are exceedingly difficult.

Types of Instruction Programs, Enrollments and Part-time Education

While regular day-time Soviet university and institute programs trace their origins to a time long before the Revolution, the alternative evening and extension-correspondence higher education facilities came into being only after 1917. Extension-correspondence training was first offered by regular higher educational establishments in the late 1920's. Some of this training was conducted by evening divisions (or subdivisions) (*vechernie fakul'tety*, or *otdeleniia*), and some by independent institutes for extension-correspondence training (*instituty zaochnogo obrazovaniia*). Evening divisions were prominent during the period of accelerated training and the "proletarization of cadres" policy of the early 1930's, when 8 to 10 percent of all students enrolled in higher educational establishments attended evening courses. From the mid-1930's to the mid-1950's, these evening divisions accounted for a relatively small proportion of all students. In the late 1930's there were about a dozen evening divisions in operation in regular institutions, and three institutes set up expressly to provide evening instruction. Attendance at evening divisions was usually light, and in statistical compilations it was commonly aggregated with regular enrollment.

A comparable low rate of enrollment was characteristic of extension-correspondence programs in the 1930's; graduations were virtually negligible. Toward the end of the 1930's the extension-correspondence type of training began to expand rapidly, but then was almost wholly suspended during the Second World War.[65] Upon resumption of extension-correspondence programs after the war, prewar levels were soon restored and quickly surpassed, so that in 1959 extension-correspondence programs in Soviet higher education accounted for two-fifths of all students enrolled. It is presently receiving increased emphasis and it is contemplated that it will become the prevalent type of higher education in the early 1960's.

1. *Types of Instruction Programs*

The three basic types of instruction programs offered by Soviet higher educational establishments are: regular day (*dnevnye*), or full-time study; part-time evening (*vechernie*); and part-time extension-correspondence (*zaochnye*) pro-

[64] 1953 data from Liasnikov, *Podgotovka*, p. 89.

[65] A. I. Demenev and N. S. Dobrovol'skii, *Vysshee obrazovanie na Urale* (Higher Education in the Urals), Sverdlovsk, 1958, p. 62.

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grams.[66] Attempts to equate these programs with particular institutes produces a good deal of confusion. In actual practice, one, two or all three of these programs may be offered by one institution. Each of the three is a distinct type of program, but a fusion of the three is probable when contemplated educational reforms are implemented by the mid-1960's.

Institutions offering regular (day) and evening instruction programs are frequently identified by Soviet authorities as "stationary" or "permanent place" establishments (*statsionarnye VUZ'y*),[67] and enrollments under each program are not differentiated in reports. The tendency to relate the two programs is quite natural, for while they differ in intensity and time of instruction, they employ identical teaching methods—instruction through attendance at lectures, participation in instructional activity and direct student-teacher contact. The regular (day) program of up to 42 instruction hours a week is more demanding than the part-time evening programs. Students attend classes in both the morning and afternoon, though as late as 1958, owing no doubt to a shortage of facilities, regular (day) programs in some schools were conducted in morning and afternoon sessions[68] for two separate groups. Part-time evening program students in contrast receive less than 20 hours of instruction weekly, and do not necessarily meet every night of the week.

Soviet extension-correspondence programs in higher education are in a sense unique.[69] The student does his work independently or with very infrequent direct contact with the teacher, limited in some fields and institutions to examination sessions. In others, however, more rigorous guidance is provided; up to 12 hours of contact with teachers (lectures, laboratory and consultation) per week for 6 or 7 months per year may be the practice.[70] During the rest of the time, however, the student's study activities are guided by printed instruction aids and regularly scheduled home assignments. In addition, the extension-correspondence student performs certain assignments—laboratory exercises, for example—either in a regular higher educational establishment or in a special facility where an instructor's counselling is also available. Extension-correspondence and evening enrollment is frequently classified in a single category by Soviet authorities as persons studying "without separation from production" (*bez otryva ot proizvodstva*). At present, the majority of students in this group are enrolled in extension-correspondence rather than evening programs.

On the basis of a count of institutions and their divisions,[71] Soviet higher educational establishments in 1959 operated 696 full-time (day) institutions (not counting, of course, military, police, party and other such specialized institutions). Part-time education was distributed as follows:

- 9 Independent evening institutes, which offered only evening programs of instruction
- 49 Independent evening branch divisions of regular higher educational establishments, operating in localities different from the seat of the parent institution
- 250 Evening divisions attached directly to and located on the premises of the regular higher educational establishment
- 55 "Branches" of 23 independent extension-correspondence institutes (of these 23, two were independent branches of regular higher educational establishments with one unit each, and the other 21 were all-union extension-correspondence institutes which operated altogether 53 branches in 53 different cities.)
- 471 Extension-correspondence divisions attached directly to and located on the same premises as the parent institution

There were altogether (counting branch units of institutes) 834 evening and extension-cor-

[66] In addition to these three, a fourth type, *external* (external, i.e., independent study program) has intermittently been in existence. Under this program a registered student was not required to attend lectures or participate in any of the instruction activities; he had only to pass the specified final examinations given to regular students. The *external* program was officially abolished in the summer of 1951 (*VyShkoSPR—1957*, p. 131), but recently its reestablishment has again been suggested. The *external* program was not significant numerically at any time.

[67] Enrollment in *statsionarnye VUZ'y* is occasionally conceptualized in English as "resident enrollment." Such a concept is misleading, however. "*Statsionar*" means a place or establishment which provides training both for full-time (day) and part-time (evening) students. The American concept of resident enrollment includes full-time students in attendance (and not merely registered) on a given date of reporting or throughout the academic year. In the Soviet case, enrollments are currently reported as the number of students *registered* as of October of a given year; see K. N. Bukhman, *Statistika podgotovki spetsialistov* (Statistical Reporting of the Training of Specialists), Moscow, 1960, p. 17.

[68] *VVSh*, No. 6, June 1958, p. 74.

[69] The major rules and regulations concerning extension-correspondence and evening programs in Soviet higher education may be found in *VyShkoSPR—1957*, pp. 115–31.

[70] *VVSh*, No. 6, June 1958, p. 16.

[71] Appendix IV–B–3.

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respondence instructional "units," 113[72] of which were located independently. The remaining 721 were attached directly to the regular higher educational establishments and had no independent facilities.

Extension-correspondence and evening programs of instruction were recognized officially as bona fide educational activities in 1938.[73]

[72] 9 independent evening institutes, 49 independent evening branch divisions, 2 independent extension-correspondence branch divisions, and 53 branches of all-union extension-correspondence institutes.

[73] *VyShkoSPR–1957*, p. 115.

Prior to that time, the relatively small number of students enrolled in extension-correspondence programs was not included in enrollment statistics because these students were considered merely to be taking "courses"; evening students as noted, however, were regarded as regular students and were so counted. The growth of institutions, particularly of branches and divisions attached to regular higher educational establishments, offering evening and extension-correspondence programs of instruction is illustrated in table IV–9.

TABLE IV–9.—*Total number of Soviet higher educational establishments, number of independent schools and divisions and branch units of regular schools offering part-time instruction programs, selected years, 1940–59*

Year end	Total number of higher educational establishments	Evening programs		Extension-correspondence programs	
		Independent establishments	Divisions and branch units of regular institutions	Independent establishments	Divisions and branch units of regular institutions
1940	817	8	127	17	256
1950	880	5	117	17	452
1955	765	8	205	22	412
1957	763	9	260	22	430
1958	766	9	300	23	458
1959	753	9	299	23	471

Source: Appendix tables IV–B–3 and IV–C–1; *KS–1956*, p. 202; *SSSR–Tsif–1958*, p. 356; and *Eliutin–VSSS–1959*, pp. 22, 34.

It is evident from these data that in the last two decades, evening and extension-correspondence programs in branches and divisions attached to regular higher educational establishments registered the most significant growth.

2. *Distribution of Enrollment by Type of Program*

To understand fully current trends in Soviet higher education, aggregate enrollment figures have to be analyzed with great caution, for the statistics have in some instances been manipulated to support the Soviet claim of steady expansion. Data pertinent to the distribution of Soviet higher education enrollment by type of program for selected years (table IV–10) reveal that while part-time 1959 enrollment in higher education increased 4.5-fold over 1940, regular full-time day enrollment only doubled during the same period. Chart XIII depicts graphically the distribution of Soviet higher education enrollment by type of program, for selected years. In 1959 evening and extension-correspondence enrollments combined represented 49.4 percent of the total enrollment in Soviet higher education. In the fall of 1960, of the total 2,396,000 higher education students, 1,240,000, or 51.7 percent, were enrolled in evening or extension-correspondence programs.[73a] In other words, slightly over one-half of the students attended Soviet universities or institutes *on a part-time basis.*

This unique situation should be taken into account when comparisons are made with enrollment in American colleges and universities. Full-time resident enrollment in the United

[73a] *SSSR–Tsif–1960*, p. 308.

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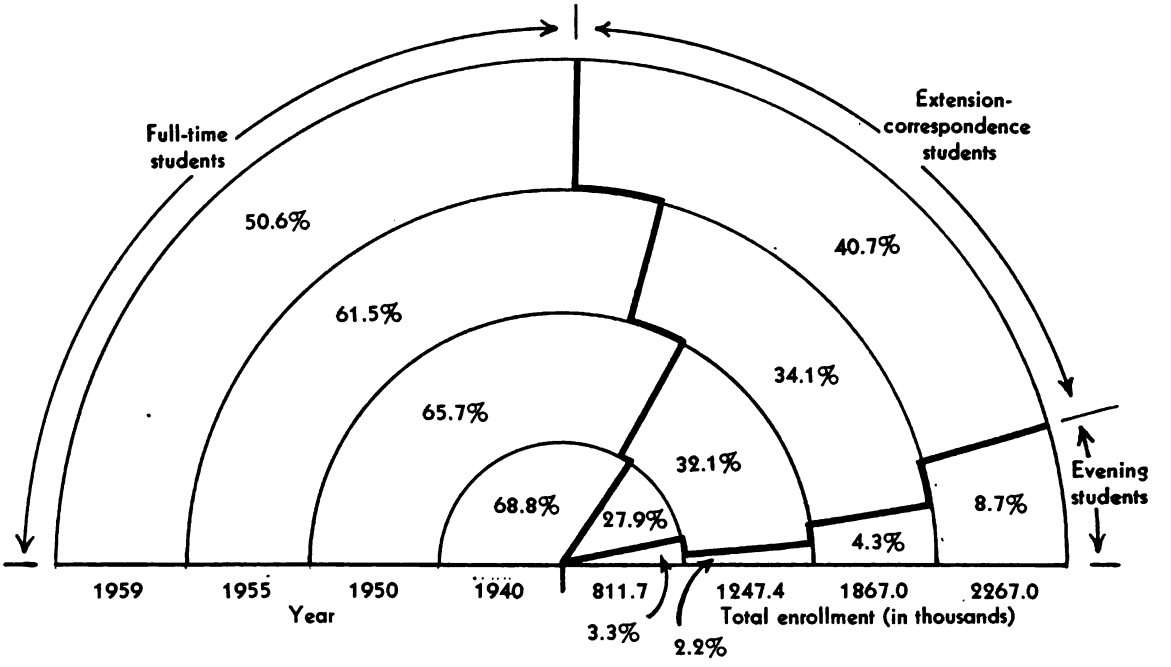
CHART XIII.—COMPOSITION OF ENROLLMENT IN SOVIET HIGHER EDUCATION BY TYPE OF PROGRAM, SELECTED YEARS



Sources: appendix table IV–A–1–S and text table IV–10.

States in 1959 (3,400,000 [74]) was actually one-third higher than Soviet total enrollment in the same year and *three times* higher than Soviet regular full-time (day) enrollment.[75]

[74] U.S. Dept. of Health, Education and Welfare, Office of Education, *Higher Education*, Vol. XVI, No. 5, January 1960, p. 12. Of this total, 3,000,000 were in 4-year institutions and 400,000 in 2-year institutions.

[75] Soviet propagandists (cf. Ia. A. Ioffe, *Strany sotsializma i kapitalizma v tsifrakh* [Countries of Socialism and Capitalism in Figures], Moscow, 1957, p. 110) perpetrate what appears to be a deliberate fraud in order to show that the U.S.S.R. led in total and per-capita higher education enrollments, simply by "adjusting" U.S. enrollment figures arbitrarily to a "comparable level"; i.e., the actual U.S. higher education enrollment of 2,700,000 in 1955 was reported as 1,125,000.

TABLE IV–10.—*Enrollment in Soviet higher education by type of program, 1940, 1950, 1955–59*

Year end	Total enrollment		Full-time (day) students		Part-time students					
					All part-time		Evening		Extension-correspondence	
	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent
1940...	811.7	100.0	558.1	68.8	253.6	31.2	26.9	3.3	226.7	27.9
1950...	1,247.4	100.0	819.9	65.7	427.5	34.3	27.3	2.2	400.2	32.1
1955...	1,867.0	100.0	1,148.5	61.5	718.5	38.5	80.8	4.3	637.7	34.1
1956...	2,001.0	100.0	1,177.1	58.8	823.9	41.2	100.8	5.0	723.1	36.2
1957...	2,099.6	100.0	1,192.9	56.8	906.7	43.2	127.4	6.1	779.3	37.1
1958...	2,179.0	100.0	1,180.0	54.2	999.0	45.8	153.0	7.2	846.0	38.6
1959...	2,267.0	100.0	1,146.0	50.6	1,121.0	49.4	196.0	8.7	925.0	40.7

Sources: Appendix table IV–A–1–E; *Dos–1957*, pp. 278–79; *Pravda*, Nov. 2, 1958; *SSSR-Tsif–1958*, p. 356; *Eliutin-VSSS–1959*, p. 34; *NarKhoz–1959*, p. 830; *NarKhoz–1960*, p. 740.

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The postwar period was characterized by a substantial expansion in Soviet extension-correspondence and evening programs, but by only relatively modest gains in full-time (day) enrollment. The majority of students in evening and extension-correspondence programs were enrolled in divisions and branches attached to regular higher educational establishments rather than in independent evening and extension-correspondence institutes. In this sense Soviet extension-correspondence and evening programs must be viewed as adjuncts to regular higher education.

The enrollment trend in regular full-time Soviet higher education during the last 20 years may be summed up as follows. In the fall of 1946 the 1939 level of about 620,000 was restored and surpassed (649,000). By 1956 the figure doubled to 1,177,000 and then remained more or less stationary through 1957 (1,192,900) and 1958 (1,180,000), but declined in 1959 to 1,146,000. This summary indicates a remarkably slow rate of growth of full-time (day) higher education, particularly since 1955; the 1959 full-time day enrollment had declined to the 1955 level. It seems evident that from the fall of 1955, regular full-time enrollment in Soviet higher education was *deliberately* frozen at a level of about 1,100,000 to 1,200,000.[76] This policy of holding down the level of regular enrollment is reflected in the 1958 educational reform, as well as in the current Seven-Year Plan, both of which are explicit on this point. Currently, *regular* higher education enrollment in the U.S.S.R. is below the level of U.S. college enrollment in 1937 (1,300,000 resident students). Because of the prevailing educational policies dictated by other, socioeconomic considerations, the potential availability of higher educational opportunity is thus being diminished by the Soviet planners, who offer a probably inferior part-time substitute in order that the pursuit of higher education will not take people away from full-time employment.

Until 1953, official Soviet sources combined evening enrollments with full-time day enrollments.[77] As a result, in the course of the years the concept of enrollment (and of admissions and graduations) in "permanent establishments" (*statsionarnye VUZ'y*) emerged, differentiating part-time evening and full-time day enrollments from extension-correspondence program enrollments.

The figures which appear in the "R" rows ("regular") in appendix table IV–A–1–E (and elsewhere in this volume) are a combination of day and evening students. Until 1953, in fact, there was little need to be concerned with part-time evening students as a category separate from day students, for their number seldom accounted for more than 5 percent of the combined full-time day and part-time evening enrollment. From 1953 on, however, part-time evening enrollment began to increase rapidly, with gains of from 20,000 to 40,000 students annually. In the fall of 1959 evening enrollment had increased to almost 9 percent of the total, almost a seven-fold increase in absolute terms in the course of the decade (1950—27,300; 1959—196,000). This trend will undoubtedly continue, since a "several-fold" increase by 1965 has been projected. The expectation of Soviet planners is that eventually all three types of instruction program will "blend together," [78] so that each student in the course of his training will have participated at one time or another in all three types of instruction programs.

It is now contemplated that by 1965 part-time students will be the dominant component of Soviet higher education enrollment.[79] This shift from full-time to part-time study, either of the extension-correspondence or evening variety, will continue to play an important role in Soviet higher education developments in the 1960's.[80]

By 1965 the trend toward part-time study will become even more pronounced. The Minister of Higher and Secondary Specialized Education has already announced a target enrollment of 2,000,000 in part-time (evening and extension-correspondence) programs at the end of 1965.[81] It is anticipated that at least 60 percent

[76] In the fall of 1960, regular enrollment was 1,156,000, still way below the 1955–58 level.

[77] For a number of years the inclusion of evening students in the category of regular students indicated a rising trend of "stationary establishment" enrollment, as evidenced by the following figures:

1954	1,146,500	1957	1,320,300
1955	1,227,900	1958	1,333,000
1956	1,278,000	1959	1,342,000

[78] *Eliutin—VSSS—1959*, p. 73. For further discussion, see the section on curricular reorganization in this chapter.

[79] *Eliutin—VSSS—1959*, p. 90.

[80] *Ibid.*, p. 31.

[81] *Ibid*, p. 90.

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of all higher education students by that time will be enrolled in part-time programs.[82] Since a 2,800,000 to 3,000,000 total enrollment is anticipated for 1965, full-time enrollment will in effect *decline* to the 1946–48 level, with only 800,000 to 1,000,000 students enrolled in regular higher education.

3. *Extension-Correspondence Programs*

The rapid expansion of extension-correspondence training in Soviet higher education has produced great diversity in the institutional sponsorship of the program.[83] In the array of institutional arrangements, two merit close attention: the extension-correspondence divisions (*fakul'tety*) and the independent extension-correspondence higher educational establishments. Many regular (full-time, day) institutions of higher education have an extension-correspondence division, with fields of specialization similar to those offered in the regular programs, though fewer in number.

Distinct from the extension-correspondence divisions are the *independent* extension-correspondence higher educational establishments which do not conduct regular (full-time, day) programs; their activities are devoted exclusively to extension-correspondence training. All these independent institutions are multi-branch establishments not only in terms of the specialties they offer, but in terms of the geographic dispersion of the branch units. These extension-correspondence institutes are of two types: (1) all-union (*vsesoiuznyi*), or national, and (2) local. In 1959 there were 16 such all-union institutions and five local establishments.[84] The peculiarity of the all-union extension-correspondence higher educational establishments is the system of local branch units (*filialy*) scattered throughout the country. The All-Union Extension-Correspondence Institute of Jurisprudence in Moscow, for example, has 13 branch units as well as six study-consultation offices (usually referred to by the abbreviation *UKP—Uchebno-Konsul'tatsionnyi Punkt*), one of which is located in the city of Toyohara (southern Sakhalin), which is probably as far as one can get from Moscow and still be on Soviet soil. The combined number of local branch units and study-consultation offices is sometimes extensive, as, for instance, the All-Union Extension-Correspondence Institute of Trade, which has 28 units and offices in different cities.

"Local" extension-correspondence higher educational establishments are not so ramified as the all-union institutes, though they also have branch units and offices. The Northwestern Polytechnical Extension-Correspondence Institute in Leningrad has six study-consultation offices, one of which is located as far away as Kaliningrad (former Koenigsberg) in what used to be East Prussia.

Extension-correspondence training is conducted as follows.[85] During the academic year students must complete reading assignments according to the special plans designed for each subject. His progress is checked about once every two weeks when he mails in such assignments (*kontrol'nye raboty*) as essays, completed questionnaires and problem solutions. Throughout the year he can make use of study-consultations (*uchebnaia konsul'tatsiia*), which, in the case of an independent extension-correspondence institute, may be provided directly through a local branch of the institute or by indirect

[82] Kotov, *op. cit.*, p. 137.

[83] A concise survey of the development of extension-correspondence programs may be found in *APS–NarObr–1957*, pp. 411–16. There are also literally hundreds of articles in *VVSh* and other Soviet periodical literature on this subject. One of the most significant, on the recent reorganization of extension-correspondence education, is in *VVSh*, No. 3, March 1959, pp. 4–8.

[84] See appendix IV–B–3. The 16 all-union extension-correspondence institutes offered training in the following fields: polytechnical, power engineering, machine building, food industry, textile and light industry, engineering construction, road building, railroad transport, communication, forestry, economics, trade and jurisprudence. There was also one so-called "central" higher educational establishment of fisheries and the technology of fish products. In addition, there were two independent extension-correspondence branches: petroleum engineering (Tatar ASSR) and chemical technology (Kemerovo). The local establishments were: Northwestern Polytechnical (Leningrad), Ukrainian Polytechnical (Khar'kov), and three pedagogical institutes (Armenian and Kirgiz republics, and Moscow).

[85] Vsesoiuznyi Zaochnyi Politekhnicheskii Institut (All-Union Extension-Correspondence Polytechnical Institute), *Kak dolzhen organizovat' uchebnuiu rabotu student* (How the Student Should Organize His Studies), Moscow, 1958. This 47-page pamphlet outlines the organization of instruction from the scheduling of assignments to the obtaining of medical disability excuses.

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assignment of local teaching personnel through the study-consultation office mentioned above. If the student desires, he may also request instructional guidance through the mail. The student may make use of laboratory as well as library facilities of the local regular higher educational establishment by becoming "attached" (*prikreplenie*) or assigned to it by his extension-correspondence institution. In the case of extension-correspondence divisions of regular higher educational establishments, these procedures are simplified; the student deals with only one division in all instructional matters. Finally, the student is granted several weeks per year of additional leave from his work (some with full pay, some with part pay) in order to take the biannual examinations, as well as several months' leave of absence in order to prepare for his final state accrediting examinations or for the preparation of his thesis.

Prior to the biannual examinations and during the preparations for final examinations, the student is required to attend review and drill sessions. Although it is suggested that 70 to 80 percent of the student's time be devoted entirely to "independent study," [86] many reports lead to the conclusion that the extension-correspondence divisions of regular higher educational establishments and sometimes the *UKP* (study offices) of independent extension-correspondence institutes hold evening lectures and regular class sessions which may total as much as 12 hours per week for several months a year. Thus although there is no formal attendance requirement, there may be frequent face-to-face contact between members of a teaching staff and individual students. This contact is achieved partly through regularly scheduled consultation meetings but largely through irregular conferences arranged at the student's request. How frequent these face-to-face contacts are is impossible to ascertain, but they are undoubtedly handicapped by the extremely unfavorable student-teacher ratio of 65-80 students per teacher.[87] (In regular higher education the norm is 10 to 15 students per teacher.) With the opportunity for direct contact with the teacher so exceedingly limited, the student must rely almost wholly on textbook learning and his resources of self-discipline. He is advised,[88] for example, to study 4 to 5 hours at least three nights a week, as well as to allot a "generous portion" of his Sundays to study. Rules state meticulously how assignments are to be completed, and instruct him how to work with books, what materials to memorize, etc. Occasionally, a representative of the teaching staff "spot checks" to see whether the student is making progress.

Theoretically, the training period for extension-correspondence programs is 5 to 6 years, but it is not unusual to hear of students who have not finished the required courses even in 8 or 10 years.

Although it is occasionally claimed that extension-correspondence training is now "equivalent" to instruction received in regular institutions, recent Soviet reports admit that extension-correspondence training continues to be inferior in quality.[89] Often the amount of course work is trimmed down, particularly in nonspecialized subjects, so that in essence the specialization is often a narrower one. The unsatisfactory appraisal of extension-correspondence training was echoed by Mr. Eliutin, Minister of Higher and Secondary Specialized Education: "We cannot close our eyes to the serious shortcomings [of the extension-correspondence programs]. The major deficiency is that the level of theoretical preparation of the specialist in extension-correspondence and evening higher educational establishments is in most instances substantially lower than that attained in the full-time system of education." [90] Confirmation of equal reliability comes from the Head of the Division on Methodology of the Ministry of Higher and Secondary Specialized Education, D. I. Vasil'ev: "The work of extension-correspondence and evening programs still does not receive the proper attention, for a number of people in higher education view it as a second-rate activity." [91] Extension-correspondence training, reported the newspaper *Kazakhstanskaia pravda*,[92] is "accepted by the students . . . as an . . . in-

[86] *Ibid.*, p. 9.
[87] *VVSh*, No. 6, June 1958, p. 19.
[88] VZPI, *Kak dolzhen organizovat' uchebnuiu rabotu student*, p. 18.
[89] *VVSh*, No. 7, July 1954, pp. 1–4, and various issues during 1958 and 1959.
[90] *Eliutin-VSSS–1959*, p. 67.
[91] *VVSh*, No. 3, March 1959, p. 4.
[92] Oct. 21, 1959.

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ferior substitute." It is now hoped that the reorganization of extension-correspondence education, with increased emphasis on this type of training within the framework of the regular divisions of higher educational establishments, will result eventually in "improvement in quality." [93] Under the reorganization, those students who spend the first 2 years of their higher education studies in extension-correspondence divisions will be supervised by the teaching staff of the regular department. This closer contact and guidance is intended to be a measure to improve the quality of extension-correspondence programs.

All extension-correspondence training programs have suffered from a common ailment. Enrollments have been very high, but the rate of graduation is very low. This may be caused by the extracurricular involvement of the student, lack of time or energy, or the inherent inefficiency of such training. In 1953, for example, the All-Union Polytechnical Institute (*VZPI—Vsesoiuznyi Zaochnyi Politekhnicheskii Institut*) graduated a mere 400 students (engineers); yet in the preceding years, the total enrollment had averaged 15,000 students.[94] In 1958 this institute, with an enrollment of 30,000 students, graduated a total of 1,300.[95]

Although in the aggregate there has been some improvement in graduation rates among extension-correspondence students, the program continues to be the most inefficient form of training in the U.S.S.R. Furthermore, some of the improvement may be attributable to some admission practices which have emerged. In the All-Union Extension-Correspondence Institute of Agriculture (*VSKhIZO*), for example, where the success rates reached noteworthy highs of 32 percent in 1950–55 and 41 percent in 1956–57, it was discovered that over 50 percent of the students were agricultural technicians (semiprofessional technicum graduates) who had already been "trained." [96] Many who had enrolled did so for the sake of "formalization" of their education (*oformlenie obrazovaniia*), and used the "speed-up" (*skorostnichestvo*) method, completing the program in one and a half to two years instead of the required five, simply because they were already trained in the same field.[97]

Shortage of time is probably the main predicament of Soviet extension-correspondence and evening program students. In the Kiev Polytechnical Institute, for example, it was reported in 1958 that only one-quarter of the entering extension-correspondence students succeeded in reaching the last year of study.[98] This situation is ascribed to the fact that the student who works full time simply cannot keep up with his studies. Another difficulty was mentioned by Mr. Eliutin, who observed that most extension-correspondence institutes

> had neither time nor sufficient facilities [*uchebno-material'naia baza*] to deal with the masses of people. The majority of extension-correspondence institutes are located in large urban centers, and they cannot handle efficiently their many branches, divisions and *UKP*. Quality was poor in many instances. As the system of evening and extension-correspondence higher education expanded, its shortcomings became more obvious. Consequently the necessity arose to have a new organization for this type of instruction system.[99]

This new system is now in the making. Extension-correspondence programs are now to be subordinated chiefly to regular higher educational establishments, which have the local base, teaching staffs and resources to provide better training.

The expansion of extension-correspondence higher education (particularly in technical fields) has brought about new regulations aimed at denying entirely or drastically curtailing the opportunity for individuals to undertake such training for the purpose of changing their occupational specialization. Indications are that in

[93] *Molodoi kommunist*, No. 1, January 1960, p. 34 (Eliutin).
[94] *VVSh*, No. 7, July 1954, p. 3.
[95] VZPI, *Kak dolzhen organizovat' uchebnuiu rabotu student*, p. 3. Ideally it would be more meaningful to compare the number of graduates with the number of admissions, but admission figures were not found for individual extension-correspondence institutes. For regular higher educational establishments the stock (enrollment)-flow (graduations) model indicates a 15–17 percent rate of graduations to total enrollment, a rate four times higher than that for the extension-correspondence programs cited, where the 1958 graduation/enrollment ratio was 4.3 percent. If we make the hypothetical assumption that admissions are one-sixth of total enrollment (in *VZPI*, 5,000), the success rate would be 26 percent, as compared with about 70 percent in regular higher educational establishments.
[96] *VVSh*, No. 6, June 1958, p. 12.
[97] This has an important implication, for it is the current policy to admit to extension-correspondence programs on a preferential basis those already active in the field.
[98] *Pravda Ukrainy*, Dec. 4, 1958 (Prof. S. Karta, Chairman of the Mechanical Engineering Division of the Kiev Polytechnical Institute). Half of the evening division students in the last year of study also reportedly had failing grades.
[99] *Molodoi kommunist*, No. 1, January 1960, p. 34.

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recent years admissions to a given field of extension-correspondence training have to a large extent been restricted to persons already engaged in that specialty.[1] This limitation is intended mainly to prevent technicum graduates from changing, through the medium of higher education, an already acquired specialty, though obviously they may seek higher education within their original field.

The shifting orientation of Soviet higher education toward greater reliance upon extension-correspondence programs is deeply embedded in the educational reform. Despite the admitted shortcomings, Soviet authorities continue to insist that the extension-correspondence programs have great potentiality for becoming the "better" type of education. They reason that persons who hold jobs are more mature, responsible and experienced and that they can reconcile theoretical learning with work experience. The economic rationale, however, is seldom mentioned, though it is palpably clear. Greater reliance upon extension-correspondence education means the retention of students in gainful employment positions. It means, moreover, a substantial reduction in the cost of education to the state, since extension-correspondence students are for the most part self-supporting during the course of their study. Although various benefits are provided these students, the involved public expenses are substantially smaller than in the case of full-time students. The recently announced improvements in these benefits,[2] especially the lengthening of leaves with pay and higher pay ceilings, do not outweigh the savings achieved by the reduction of full-time study.

There is undoubtedly much popular pressure to get higher education. To meet it, the Soviet Government wants to create qualitatively "equal education." Additional pressure comes from the labor squeeze. It is a simple fact that the expansion of part-time higher education will result in the stabilization of full-time enrollment. The essential objective of the reorganization of higher education is to make extension-correspondence programs, which were originally a separate facility, an integral part of regular higher education. Soviet authorities seek to create a new blend of all three types of instruction program and to live up to their claim that work, education and theory are being combined with practice, while meeting the country's economic requirements at the same time.

4. *The Educational Reform and New Programs of Instruction in Soviet Higher Education*

In the next 2 to 5 years a new system of higher education will emerge in the U.S.S.R. It has been officially announced that:

> the character of the existing regular [day] education will be changed. Along with the elimination of the division between education and practice, will come the obliteration of the distinction between regular, extension-correspondence and evening programs. A unified system combining all three forms of education will be established. This system will thus integrate, at different stages of instruction, part-time study of the evening and extension-correspondence type with full-time study during the day. The system will be adopted in the vast majority of higher educational establishments in the fields of engineering, agriculture and the humanities [i.e., universities and pedagogical institutes].[3]

It is perhaps premature to predict what the content of the programs of instruction in the various specialties will be. Although the new instruction programs were introduced at the beginning of the academic year 1959–60, it will be several years before they become operational. The rector of Leningrad State University, A. Aleksandrov, in a conversation with the author in May 1959, said that he believes the new study program will take ultimate shape probably by the mid-1960's, and until then, in his judgment, there will be "experimentation, adjustment, and give-and-take by trial and error." Likewise, in a conversation with a group of American educators visiting the U.S.S.R. in the fall of 1959, Minister Eliutin declared that the new programs will go through a period of experimentation for some time to come.

Similarly, the director of Leningrad Polytechnical Institute, V. S. Smirnov, declared (on his visit to the United States in March 1960) that it will take "8 or 10 years before the final

[1] *VyShkoSPR—1957*, p. 115; *Sprav VUZ—1958* and *1959*, *passim*.

[2] *Komsomol'skaia pravda*, July 11, 1959.

[3] *Eliutin-VSSS—1959*, p. 73.

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shape of the new programs will be fully realized." He said, furthermore, that his engineering institute was then conducting three programs. One applied to students already enrolled and was in effect the old program, with 6 months to be added in the fourth year for extended practical experience. Otherwise the curriculum and course syllabi were the same as in the "pre-1957 program." For those who entered the regular (day) division of the institute in 1959, two programs were developed: veterans and students who have had two or more years of prior employment were to study according to the "old program," except for an additional year of extensive industrial practice after the fourth year; on the other hand, students who entered the regular division directly from secondary schools [4] were to enroll for the first 2 years in an extension-correspondence program (to be supervised by the regular departmental staff and not by a separate extension-correspondence division) and shift over in the third year to a regular day program. Evening division students were to continue as before. Mr. Smirnov added that he had "proposed that one program be developed for all" to avoid confusion, but was overruled by the Ministry.

Also in March 1960 the First Deputy Minister of Higher and Secondary Specialized Education, M. A. Prokofiev, indicated to the author that the Ministry was "just beginning to approve new programs of instruction only for courses in the first year of study." The changeover would take place by "taking care of one year at a time," with the aim to set up a tentative program in several years' time. Mr. Prokofiev was insistent that: (1) the basic roster of specialties offered in higher education had not changed and would not change significantly save for the addition of a few specialties "needed in new fields"; (2) the reform of higher education would result in "changes in the methods and organization of instruction," but not in "changes in subject matter content offered to the student during the full length of study." The Ministry had by then approved, published and distributed to higher educational establishments course contents (*kursovye programmy*) for the first year of study and had approved "in principle only" the proposed overall curricula for the various specialties. He added that the Ministry was "exercising utmost vigilance" against the tendency of individual institutions "to cut down on course contents and the number of courses required." Such reductions had been attempted by some higher educational establishments to "ease the burden" of the students enrolled in regular programs on a part-time basis (i.e., in extension-correspondence programs for the first two years).

The point to be emphasized is that all Soviet sources repeatedly claim that whatever the changes in the programs of instruction, they will not alter considerably, or at least will not appreciably reduce, the subject matter content of the individual instruction programs for any higher education specialty. Beyond doubt, this is the Soviet official policy and intent, but the results are yet to be seen. Already many Soviet press stories report—despite the all-out effort to propagate the slogan "Active work is not a hindrance to study" [5]—that exhausted youths sleep through lectures, cut classes, or simply quit. The full-time work day lasts from seven o'clock in the morning until five in the afternoon, on top of which the students study from seven to eleven o'clock 4 nights a week. The response to those who cannot keep the pace is: "Good riddance. We don't even pity them. We are glad that such indifferent people are removed from the institute at the very start." [6] The propaganda drive that is sweeping the country is reflected in such headlines as "First-Year Students Study in a Mine," "Construction Site Is Lecture Hall," and "They Are Taking Examinations in the Production Shop." [7] No one is supposed to complain about overburdening (but even parents "come to plead that we take it easy on the boys" [8]).

The educational reform postulates that there should be a "closer link between productive employment and higher education," [9] and it is largely in response to this requirement that the programs of instruction are being adjusted to intensify part-time study. While full-time edu-

[4] One-half the students in Leningrad Polytechnical Institute were in this category.

[5] After an article by that title, "Trud uchen'iu ne pomekha," *Komsomol'skaia pravda*, Nov. 3, 1959.

[6] *Idem.*

[7] *Ibid.*, fall of 1959, various issues.

[8] *Ibid.*, Nov. 3, 1959.

[9] See specific recommendations in the text of the reform, appendix I–ERL.

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cation can still be distinguished from part-time education, it is not unlikely that in the future there will be a substantial fusion of the two. Recent Soviet official pronouncements on this subject indeed continue to distinguish between part- and full-time study.[10] It is said that by the mid-1960's there will be two types of higher education. The first is termed "study without leaving employment" (*bez otryva ot proizvodstva*) and under this general heading three subtypes are to emerge. One will consist of the familiar extension-correspondence training programs, in which students pursue their studies largely on their own, with face-to-face contact with teaching personnel during examination sessions, required laboratory exercises, and consultation periods in the evening or on special dates during the course of the year.

The second subtype will be in essence the evening instruction program (*vechernee obrazovanie*), modified, however, by the introduction of "alternating shift" higher education instruction. "Alternating shift" higher educational establishments will conduct instruction in accordance with the usual methods used in evening programs, but at hours suitable for those who work day shifts (evening higher educational establishments) as well as those who work night shifts (morning higher educational establishments).

The third subtype will be the newly created (or, more correctly, resurrected) so-called plant–higher technical establishment (*Zavod VTUZ*). Under this program students will work part of the day and study part of the day, alternating study and work throughout the day. Or they might study for three months, then work for the next three and so on. So far the development of a typical program for these plant–higher technical establishments has not progressed beyond the stage of discussions and proposals. Understandably, these schools are to function in the engineering and technology fields only.

The second main type of higher education instruction is termed "study with leave from employment" (*s otryvom ot proizvodstva*). The major form of instruction under this program will still be called "regular day studies," but the proposed changes are numerous.[11] In the first place, the very name "day study" becomes misleading.[12] During their 5 or 6 years of study the "day" students will engage in part-time study or full-time employment plus some study for various lengths of time. The schemes vary according to specialty field. During full-time employment periods, students will study as extension-correspondence students. A summary of the program for different specialties follows: [13]

[10] *VVSh*, No. 9, September 1959, pp. 3–5.

[11] Eliutin, in *Molodoi kommunist*, No. 1, January 1960, pp. 30–34; *Pravda*, Dec. 24, 1959.

[12] The 1960 admission rules call this new program "day study combined with production employment" (*dnevnoe obuchenie v sochetanii s proizvodstvennoi rabotoi*).

[13] Compiled from miscellaneous sources. See also the tabulation in Bukhman, *op. cit.*, pp. 10–11; this latter source states that these programs have been "approved into law."

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Specialty field	*Scheme of study and employment*	*Notes*
A. Engineering; engineering-economics.	Full-time employment/part-time study (evening or extension-correspondence) during first 2 years (1 year, 4 months); 6 months' full-time employment during any of the third to sixth years of study.	Applies to engineering schools of technological profile, where laboratory work is not extensive.
B. Engineering; industrial economics; trade; statistics; history.	One year of full-time employment/part-time study (evening or extension—correspondence during either of the first 2 years of study; 1 year of full-time employment/part-time study in any of the third to sixth years of study.	Applies to engineering schools with extensive laboratory or design-draftsmanship programs.
C. Agriculture; geology; civil and construction engineering; and other specialties related to seasonal activity.	Alternating periods of full-time study with full-time employment in enterprises or experimental-study plots, fields, units, etc. throughout the entire program.	Applies to all students in specialties related to seasonal activity, regardless of prior work experience.
D. Various specialties for students with an employment record in related field.	One year of full-time employment in any of the third to sixth years of study.	Applies only to students who enter higher education with two or more years of work experience in a specialty field *related* to their study (i.e., medical students previously employed in hospitals, engineers who have been employed as skilled workers in the same or a related branch of production).
E. Medicine	Full-time employment during first 2 years of study; plus the requirement above of 1 year full-time employment in any of the third to sixth years of study.	Applies to medical students already employed in the field (i.e., have semi-professional education and two or more years of work experience).
F. Engineering; university specialties: physics, mathematics; chemistry, biology and related specialties at universities; and selected engineering specialties (engineering physics, electronics, etc.).	Full-time study during first 3 years. Thereafter, 1 year of full-time employment with part-time study. Full-time study during fourth through sixth years.	Applies to all specialties which require an extensive amount of "theoretical" and laboratory work in the early stages (first 3 years). A large proportion of students in such specialties will enter higher education directly from secondary schools.
G. Pedagogy; jurisprudence; journalism; arts and related university specialties in the humanities and social sciences.	One year of full-time employment during any of the first through sixth years of study.	These specialties accept *only* students who have had two or more years of prior employment.

Thus anywhere from 1 to 2½ years, depending upon specialty field, of the total 5- or 6-year course will be spent in part-time study (and full-time employment). In the categories D, E, and G, only persons with two or more years of prior employment may be admitted. In the categories A, B, and C, the majority, but not necessarily all, should have such employment experience. Only in the F category will newly graduated secondary school applicants get preference.

According to the Engineers Joint Council mission to the Soviet Union in the summer of 1960, the structure of the engineering program was shaping up as follows: [14]

For students with two years of practical experience (5-year program):

6 months of part-time study
12 months of full-time study
36 months of full-time study [a]
12 months of part-time study
4 months of full-time study

For students entering directly from secondary school (5½-year program):

24 months of part-time study
24 months of full-time study [b]
6 months of full-time study
18 months of part-time study
4 months of full-time study

[14] The Council's full report on Soviet engineering and technicum education is scheduled for release in 1961.

[a] In the case of engineering specialties requiring a 5½ year program, an additional 6 months are allocated to full-time study.

[b] In the case of engineering specialties requiring a 6-year program, an additional 6 months are allocated to full-time study.

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Although the monthly allocations of time are approximate only,[15] they give us a clear idea of the "sandwich" makeup of the new programs.[16]

It is extremely important to note that pure (theoretical) science students, students in selected fields of engineering and those who have worked in related occupational fields for more than 2 years will be least constrained by the full-time work requirement. Where the full-time employment requirement applies most stringently is in the fields of the humanities and social sciences; in principle, persons intending to study these fields will not even be permitted to apply to higher education without 2 years of prior employment.

Until the actual programs are worked out and put into operation, the length of the study for the present student body has been lengthened by 6 months to take care of the extra work-experience requirement, but the total program is not to exceed 6 years. Students are being channeled into 6-month to 1-year employment to gain "practical experience" before graduation.

The reform has been undertaken in the name of "better education," yet there is much apprehension. "How the new study plans are to be derived and how the study-work program is to be determined are very difficult problems, because all normal conceptions of the study process have crumbled." [17]

The important question is why the Soviet regime thought it necessary to embark upon such a path of educational experimentation. The official explanation that the reform will improve the quality of education is by itself very unconvincing. There is no doubt that social reasons are deeply involved. As Khrushchev put it:

> We cannot tolerate any longer lordly contempt for physical labor. . . . Every youth should know . . . that he cannot live at the expense of his parents. . . . Regardless of the social position of his parents, each man should take his own path—study, and having done this go to work. . . . He should at first study on a part-time basis. . . . We have to value objectively how a person works, studies and behaves in the collective. . . . This will give [us] graduate specialists who will be most useful to our society.[18]

Obviously, in the strategic fields of theoretical science and engineering, the social "usefulness" of an individual, and indeed his value to the state, do not depend upon his behavior and values so much as in the case of the intellectual in the humanities, the arts or social sciences. Hence, the screening of the "worthy" for higher education will undoubtedly be more rigorous in these latter fields than in the sciences.

There are many other explanations of the program reforms. Because they inherently benefit those who worked before entering higher education, and specifically those who have worked in the same branch of the economy for which they wish to study further, the new programs may encourage the retention of employees in similar spheres of activity, since further education will serve as an occupational upgrading procedure of personnel already employed. The problem of education finance may be another factor. Minister Eliutin, when visiting the United States in 1959, denied that the new program was designed to reduce the cost of education to the state and reiterated in a Soviet magazine upon his return home that the reform was not motivated by the necessity for economies of state outlays on higher education.[19] This denial notwithstanding, other Soviet reports have pointed out that the cost of evening or extension-correspondence education is from 3.3 to 7.7 times (depending upon field) *lower* than the cost of full-time education,[20] and that it is therefore "economically rational" to introduce part-time programs on as wide a scale as possible. Even though part-time students receive fringe benefits, the fact is that when the new programs become effective, the requirement for stipend funds, the major item in the higher education budget, will be reduced by a substantial amount. Most of the fringe benefits for part-time students, such as one day's

[15] All Soviet study schedules are given in terms of instruction weeks. (See appendix tables IV–B–3 through IV–B–20 and the discussion below.) The monthly allocation disregards vacation and examination periods.

[16] Some British engineering programs (which are in fact called "sandwich programs") and several American engineering schools have for many years had a system of alternating periods of study and employment, but in most of these programs the student does not take courses while he is employed.

[17] *Komsomol'skaia pravda*, Sept. 13, 1959.

[18] *Pravda*, Apr. 19, 1958.

[19] *Molodoi kommunist*, No. 1, January 1960, p. 30.

[20] Komarov, *Ekonomicheskie*, p. 144. The difference is due largely to savings on student stipends.

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leave per week with half-pay,[21] are supported *not* from the national education budget, but from the funds of economic enterprises. Moreover, since the enterprise shoulders some of the student's expenses, the student is put under obligation to be more productive on the job.

In any event, the plan for daytime students is viewed as beneficial for the development of the "proletarian outlook."[22] In this sense, then, the new program is a scheme to proletarize the technical intelligentsia of nonproletarian background by exposing it to the drudgery of common labor. It will take, on the part of the students, courage, ingenuity and luck (as well as, in all likelihood, some parental financial aid) to overcome the obstacles thrust onto their path to education.

Entrance Requirements, Supply and Selection of Applicants in Soviet Higher Education

In every society the practical problem of deciding who shall mount the educational ladder to reach the higher ranks in the professions, administration, science, literature and the arts is a difficult one. Repeatedly the Soviet press calls for selection of the "most deserving" persons for admission to higher education.[23] Who should have the opportunity, and how is it to be secured by the individual desirous to work and rise to the top?

These have long been social problems fundamental to all educational systems: the Soviet Union is no exception. In free societies the flow of students into the various fields of learning is roughly regulated by the forces of supply and demand. Within these broad economic limits, the individual pursues an education of his own choosing: he, his parents or his scholarship sponsor defray the costs. The cost of education of course acts as a rationing device, but free societies do not have national quotas as to how many students should be educated at all, and in which fields they should be educated.

In nontotalitarian societies two other aspects enter the question of choice or demand for education. One is the individual's private demand for education on the ground that "being educated" in any field has positive social value, whatever its cost. The other is a rational economic calculation, a derived demand for education of a specific type. In the latter case, the individual calculates the future returns from education in terms of earning power and other benefits, weighing these against the total cost of education in terms of both money and time. The choice is determined by the respective weights of the costs and expected benefits.

It can be assumed that in the Soviet Union the private demand for higher education as a positive social benefit is as, if not more, ubiquitous as it is in free societies. It is concerning the derived demand that the problem emerges. The Soviet planners decide the amount and type of education to be offered: how many persons shall get higher education at all, and how many of these shall be trained as doctors, teachers, scientists or sports coaches. An individual is free to choose only among the options offered. A demand schedule for the various types of specialists is drawn up on the basis of the national economic plan.[24] This demand schedule in turn determines with "greater or less precision" the annual quotas of admission to the different specialized fields of training. To fill its respective quota, every educational establishment selects its students on the basis of merit and in accordance with a uniform set of rules and requirements.[25] This procedure supposedly ensures equality of educational opportunity for all Soviet citizens. A student thus chosen receives an education financed largely through the national budget.

The process of determining educational quotas on the basis of the state's economic needs is supported by the contention that since the Soviet Union is a "classless" society and since the cost of specialized education is borne by the state, socioeconomic factors obstructing equal

[21] *Pravda*, July 11, 1959.
[22] *VVSh*, No. 9, September 1959, p. 5.
[23] E.g., *Sovetskaia Rossiia*, July 4, 1958; *Uchitel'skaia gazeta*, July 21, 1959.

[24] *Eliutin-VSSS—1959*, p. 28.
[25] A full translation of the "Rules for Admission to Regular Higher Educational Establishments in the U.S.S.R. for the Academic Year 1959–60" is given in appendix IV–AR. The rules for 1960–61 remained in essence the same. *VyShkoSPR—1957*, pp. 38–54, presents other detailed rules and regulations concerning procedural matters, such as the appointment of examining boards, medical certificates, student transfers and credits.

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availability of higher education simply do not exist. These obstacles, the Soviet rulers contend, are characteristic of higher education only in nonsocialist countries. Obviously, such a contention misses the central point: it is not necessarily the individual's ability or financial circumstances which determine educational opportunity in a socialist society, but the preferences of the planners which restrict—sometimes rationally, sometimes arbitrarily—the individual's hopes for an education of his own choosing.

1. *Current Admission Procedures*

The exact procedure of admission to Soviet higher education cannot be understood satisfactorily unless the mechanics of the process itself are understood. First, it should be made unequivocally clear that as a general rule, no Soviet citizen is assigned, "drafted" or directly compelled to enter any specific field of study in Soviet higher education. The Soviet state provides the slots for the training of a given number of engineers or medical doctors or other specialists. The individual chooses his own slot and competes for the position. This of course does not preclude the existence of hidden blandishments and incentives used to influence the youth's choice of a field of study.

Individuals apply for admission to a higher educational establishment of their own choice for the study of a specialty (*spetsial'nost'*) offered by a division (*fakul'tet*) of that establishment. The specialties and admission quotas are *not* determined on the basis of the individual's demand for a given type of training, but by the requirements of the planners. Individuals may choose between fields, but institutions are not free to accept as many qualified students as they wish, since the quota for admissions is not altered to accommodate all who may wish to receive training in a given specialty. When a student decides to enter higher education, he must declare in his application what his intended specialty will be upon graduation. Thus the student applies for admission to a specific program of training, i.e., to a specific division of the higher educational establishment which offers such training. The applicant is then either admitted as a student, if the quota permits, or rejected either on the basis of academic and political screening or because of quota limitations. In case of rejection, a person may compete for another slot elsewhere a year or so later (since a Soviet student may not apply to more than one institution at a time).

All Soviet higher educational establishments have standard regulations governing procedures for admission. The general procedures are uniform for the country at large, though subject to change year by year. This does not mean, however, that qualitative academic requirements are uniform for all institutions and all localities, nor that political screening is uniform for all fields and institutions. The Ministry of Higher and Secondary Specialized Education, usually in the spring of each year, announces the general rules for admission, with all the requirements, preference clauses, and so forth. On the basis of these rules, each institution is responsible for selecting its quota of entering students. Thus, although general rules of admission are uniform, the particular university or institute is left with the task of selecting its students and can manipulate the selection standards by such means as adjusting the intensity of the entrance examinations or the thoroughness of political screening.

In the spring of every year every institution sets up a temporary committee on admissions. A distinction must be drawn between this committee on admissions (*priemnaia komissiia*) and the examination committee (*ekzaminatsionnaia komissiia*[26]). The examination committees are appointed by the director of the higher educational establishment to grade entrance examinations or to conduct oral examinations. In other words, this is a board of examiners, usually with two or three members for each examination subject. They handle no more than 150 examinees; if the number exceeds 150, they are divided into groups (*potoki*), each of which is

[26] *VyShkoSPR—1957*, p. 45. The makeup of committees and the procedures which they must follow are strictly regulated. Note also the problems in the translation of the words *komitet* ("committee") and *komissiia* ("commission"). What the Russians often call "commission" is equivalent to the English "committee" or "board," and we have used this translation here. This is a terminological problem and the "exact" translation is of little help. A similar semantic difficulty arises with the word *sovet* ("council"), as it is commonly used in Russian. A *sovet* has a function of a committee or a board. But regardless of what they are called, these committees, commissions and councils are usually appointive bodies.

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handled by a different board of examiners for a given subject.

The committee on admissions, on the other hand, is the screening and selection board of a higher educational establishment. It consists of between eight and 25 or more members, who generally are not members of the examination committee. The composition of the committees on admissions has changed in recent years. Today they generally consist of the institution director, his deputy, several senior professors and departmental chairmen, as well as "representatives" of the Communist Party, the Komsomol, trade unions and other "social organizations." The inclusion of these representatives is a new and radical departure from the former practice, which had prevailed for two decades, of having the admission committees composed of academic members only.

In late spring or early summer, higher educational establishments announce through newspapers and bulletin board posters that they will accept, usually between June 20 and July 31, applications for training in specified specialties.[27] An applicant cannot as a rule apply to more than one establishment at a time,[28] but if he has not been accepted by the institution of his choice by August 25, he may, by transferring his entrance examination credits, apply to another where he may be accepted if there are any vacancies. The application specifies exactly which division and specialty of training the applicant wishes to enter, and it is subject to preliminary screening by the committee on admissions. Between August 1 and 20, those who pass this first screening take competitive entrance examinations.

This leads to a second screening by the committee on admissions, who accept or reject applicants on the basis of the examination scores, which are weighted in accordance with the so-called rules for competitive entry. The admission rules list various preferences and gradations which determine the order in which students are to be admitted: some students are admitted without the competitive requirement (*vne konkursa*); others enjoy first or second priority preferences; last come those who are entitled to no particular preference (even though their records and examination scores are also weighted). Acceptances are announced between August 20 and 25, and all applicants who have been accepted must report on the day the school year begins—usually September 1; if they fail to register within ten days, their admissions are nullified.

The Rules for Admission stipulate that Soviet higher educational establishments accept persons of either sex who have completed secondary education, which, as already mentioned, may be obtained through three channels: (1) the regular 10- (now 11-) year school or (2) its equivalent (such as schools for working and rural youth) or (3) secondary specialized schools (technicums). Prior to the academic year 1955–56, the acceptance age was between 17 and 35. In May 1955 the lower age limit was abolished.[29]

Each applicant submits a letter of application addressed to the director of the higher educational establishment, in which he petitions for admission to a particular division and particular specialty. The application must be accompanied by the following set of documents (N—not required; R—required):

[27] In the course of this study, several hundred such advertisements were collected and processed. Most contained information about the specialties open and restated the general requirements. Some notices, however, supplied additional information, such as the amount of stipend involved and the availability of dormitory space.

[28] This is because of a technicality which requires the individual to surrender his *original* certificate of previous education. The Soviet press has on occasion denounced higher educational establishments for making "provisional acceptances," thus violating this requirement.

[29] *Trud*, May 21, 1955.

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	Entering class in the fall of:					
	Pre-1955	1956	1957	1958	1959	1960
1. Character reference—recommendation certificates from Party, Komsomol, management and trade union (enclosed)[a]	N	N	R	R	R	R
2. Original (maturity) certificate of secondary education (enclosed)	R	R	R	R	R	R
3. Identity document (internal passport presented in person)	R	R	R	R	R	R
4. Military service record (book or registration certificate presented in person)	R	R	R	R	R	R
5. Autobiography (enclosed)	R	R	R	R	R	R
6. Employment record transcript (enclosed; if admitted, original work book substituted)	N	R	R	R	R	R
7. Medical certificate (enclosed)	R	R	R	R	R	R
8. Photographs (4, enclosed)	R	R	R	R	R	R
9. Residence certificate (enclosed)	N	R	R	R	N	N

[a] In 1957 and 1958 character references were the last item listed among the necessary documents, but by 1959 they were the first listed. In 1960 an education assignment certificate (see discussion below) was added to this list for applicants "sent" by enterprises directly.

This impressive set of documents is entered in the applicant's file and is examined by the committee on admissions for preliminary (i.e., before the applicant is allowed to take the entrance examinations) and final screening. Six of the documents—the maturity certificate, internal passport, military service record, autobiography, medical certificate and the photographs—have been required for many years. The certificate of residence, required during the 1956-58 period, was said to be used to determine whether the applicant needed dormitory accommodations.[80] It was also used by certain categories of applicants to support claims for preferential consideration because of family residence.[81] The employment record and the character reference recommendations refer to an applicant's work experience and "social worthiness." The need for these two new documents is the result of the radical reorientation of Soviet admission policy of the last few years.

At the heart of this policy shift is the reintroduction of the concept of social inequality into Soviet educational philosophy. (No doubt inequality existed in the past also, particularly as regards the social origin of students; today the criterion of political inequality has been added.) In Khrushchev's words, "only the most worthy" [82] (*naibolee dostoinye*) are to be admitted to higher education. This is not a new thought for Khrushchev. In November of 1956 he said, "We should admit to higher education only the best among the best of those who are dedicated to the cause of Lenin." [83] He kept reiterating this principle until it was finally incorporated into the educational reform, thus radically revising the admission rules for higher education.

Since 1957, admission rules require that all higher education applicants submit a "character reference" certificate from their party, Komsomol or trade union organizations. It was following this amendment to the admission rules that representatives of these "social organizations" were once again included in the committees on admissions,[84] as they had been until the mid-1930's. In 1957 these representatives were selected from the respective organization of the higher educational establishment. Further change was introduced in 1958. It required that admission committees include also representatives of "social organizations" (party, Komsomol and trade union) *not* connected with the higher educational establishment but assigned by the respective regional committees for this purpose.[85] This measure was explained as a means of controlling abuses in admission prac-

[80] One individual, in a conversation with the author, claimed that the residence certificate was used also as a means of controlling the movements of families of former prisoners and forced laborers who had been granted amnesty after Stalin's death but were not permitted to reside in a number of cities. The residence certificate was said to have been a document certifying that a person was not an ex-prisoner but a bona-fide "resident" in a certain locality and that such residence conformed to his record with the police.

[81] The "residence preference" applied to persons whose families lived in polar regions, certain areas of Siberia and the Pacific East Coast, where higher educational facilities are virtually nonexistent. "Residence preference" is not general for all institutions and varies from one institution to another. For example, Moscow State University had more "residence preference" clauses than most other schools. See Korol, *Soviet Education*, p. 171, for a listing of certain categories of residents whose children were entitled to preferential consideration.

[82] *Pravda*, Apr. 19, Sept. 21, Nov. 16, 1959.

[83] *Zaria vostoka*, Nov. 11, 1956 (speech at Moscow youth meeting, Nov. 8, 1956).

[84] *VVSh*, No. 6, June 1957, p. 6.

[85] *Sovetskaia Rossiia*, June 4, 1958; Eliutin article in *Molodoi kommunist*, No. 5, 1958, pp. 70–72.

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tice, such as favoring relatives, accepting bribes and "fixing" examination scores. The "outsiders" on the committees were to see to it that "worthy" candidates were accepted and that the priority clauses and proper procedures were observed. As a part of the screening process, supplemental interviewing of applicants by the admission committees was required. The party and Komsomol representatives appointed to sit on the admission committees are by no means "second stringers"; indeed, some of them are important party functionaries.[36] There may also be dual-level representation—local party, Komsomol and trade union heads, plus the leading functionaries of the regional party offices.[37] Needless to say, the voice of these representatives is likely to carry decisive weight in determining the acceptance or rejection of applicants.

2. *The Qualitative Issue: The Selection of Higher Education Students in Historical Perspective*

Every educational system must grapple with two fundamental questions: Are higher education students to be selected on the basis of academic merit only, or on a basis that includes socio-economic or political criteria?

Academic admission criteria were virtually in total disuse in the U.S.S.R. from the time of the Revolution until about 1935. During the 1920's and early 1930's, a period of enforced "proletarization," preference in admissions was given to all who were "workers by origin and their descendants," whether they had the necessary educational qualifications or not. Party, Komsomol and trade union organizations decided who should be admitted. This principle was of central importance to the rapid expansion of higher education enrollment at the turn of the 1930's. In general, during this period, the only qualification tests—apart from working class origin—were literacy and "political understanding." These two tests alone were applied to applicants, who were either bona fide "proletarians" or who masqueraded as such either by obtaining forged documents or by taking "proletarian" employment positions. Until about 1936 a few institutions did give intelligence tests closely resembling American tests; but under the influence of the environmental theory of learning and behavior (which led to the pedology purge), they were abolished. The present type of examination procedure, consisting of achievement testing in one or several subjects, began in 1934; by 1936 all higher educational establishments were required to follow the procedures of multiple subject examinations which, with some modifications, are still in effect today.

Working-class applicants were given special preference immediately after the Revolution, and various restrictions were imposed on persons of "alien social origin," the intelligentsia, former proprietors, and other well-to-do groups of society. Yet, in 1927, "workers by origin" still accounted for less than 25 percent of all students in Soviet higher education. But by 1931, the effects of the "proletarization" drive began to show and the share of working class students jumped to about 58 percent.[38] By 1938, however, the share of "workers by origin" had fallen again, to 34 percent of the total number of students, and it has been on the decline ever since.[39] In the postwar period workers and peasants or their descendants were doubtless in the minority among Soviet students.[40]

Although Soviet statistical agencies regularly compile data on the social origin of students,[41] no information on aggregate trends was released for the postwar period until recently. Comprehensive statistics on the social origin of higher education students are still withheld, though Khrushchev himself announced that in 1957-58

[36] *Kazakhstanskaia pravda*, Aug. 4, 1959, reported that the regional party secretary would be a member of the admission committee of one of the engineering schools.

[37] *Sovetskaia Rossiia*, July 4, 1958.

[38] The meaning assigned to "worker by origin" is questionable, since 96 percent of those accepted even at the height of the drive were aged 22 or younger (*Kul't Stroi—1934*, p. 58). Their parents may have been "workers" or may have masqueraded as such, but the students themselves certainly could not have been employed long as "workers" before entering higher education. Note the similarity of the current policy of giving admission preference to those with prior employment.

[39] See appendix table IV–A–6 and further discussion below.

[40] Informal estimates by exchange students and visitors to Moscow and Leningrad State Universities placed the proportion of workers and peasants or their descendants at 10 to 20 percent in the late 1950's.

[41] A 1960 Soviet source states explicitly that the social group to which a student belongs is determined by his "occupational status" at the time of admission, if he has an employment record; or by his parents' occupational status if he has not, so that a person who worked for two years prior to admission could be classified as a "worker," though he may be the son of a professor, party bureaucrat, or military officer. See Bukhman, *op. cit.*, p. 19.

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only 30 to 40 percent of all students enrolled in the higher educational establishments of the city of Moscow were workers or peasants by origin, or their descendants.[42] Thus two-thirds or more of all students in the Soviet capital were descendants of bureaucrats, white-collar workers or other groups commonly included in the term "intelligentsia." [43]

The forceful drive to apply other than academic criteria in the selection of higher education candidates in the 1920's and early 1930's was admittedly a great failure. The entire scheme was primarily motivated by ideological preconceptions during a period when the regime sought political support from the workers and peasants; it distrusted the old intelligentsia and discriminated against its members in the field of higher education as well as elsewhere. While by 1928 some of the restrictions began to be gradually removed,[44] the drive for recruiting "proletarians" into higher education was just beginning to gain impetus and reached its height in 1931. Within a short time there was a drastic decline in the quality of the candidates selected. The situation was further aggravated by the accelerated training program and the low quality of instruction caused by shortages of teachers, textbooks and training facilities. As a result, in December 1935 restrictions on the social origin of applicants were removed and the principle of academic selection as it was to exist until 1955 was introduced.

The principle of selection by academic criteria was enforced by achievement testing in several subjects taught in secondary schools. The tests were administered by individual higher educational establishments on the basis of a "standard" program recommended by the Commission on Higher Education (the counterpart of the current Ministry of Higher and Secondary Specialized Education). While the examination coverage was supposed to be standard, individual higher educational establishments made up their own examinations and thus by varying the number and difficulty of the questions could in effect vary the admission standards to suit their own needs.

Exemption from the competitive examinations was, until recently, granted by all higher educational establishments to persons who had completed secondary school with distinction—called *otlichniki* until 1945 and today called *medalisty* ("maturity certificate holders with gold or silver medals")—as well as to the top 5 percent of outstanding semiprofessional school graduates committed to continue training in their original specialty.

With the increased rigor of selection procedures during the late 1930's and the postwar years, another difficulty arose, i.e., the often criticized exploitation of personal connections (*blat, semeistvennost'*) by parents determined to have their children accepted in an institution of higher education. Khrushchev has said: ". . . it sometimes happens that a person is admitted to a higher educational establishment not because he is well prepared, but because he has an influential papa and mama who can help him to get in." [45] It was also said that after the general competition on the examinations, it was the "competition of the parents" which decided admission. Minister Eliutin took note of this situation when he declared: "We must take radical measures to put an end to the gross violations in admission practice." [46] Among the measures introduced in recent years are the annual rotation of examination committees (composed of two or three members all of whom grade the same examination) and the requirement that applicants submit written examinations under a pseudonym.

While many malpractices undoubtedly exist, exaggerated significance should not be assigned to them, since some of the recent publicity surrounding the irregularities may have been deliberately stimulated. Khrushchev and other Soviet spokesmen have gone overboard in making an issue of the "abuses" for former admission practices so as to ease the introduction of the new political controls over the selection of

[42] *Pravda*, Sept. 21, 1958.

[43] For further discussion of the composition of this group, see ch. VI.

[44] In that year, scientific workers, literary workers, and sculptors, and their children, were put on an equal footing with workers; in 1931, engineers and technical workers were added; in 1932, bookkeepers and distribution specialists and technicians in socialized enterprises, etc. See R. A. Feldmesser, *Aspects of Social Mobility in the Soviet Union*, unpubl. Ph.D. thesis, Harvard University, 1956; and by the same author, "Social Status and Access to Higher Education: A Comparison of the United States and the Soviet Union," *Harvard Educational Review*, Vol. XXVII, No. 2 (Spring 1957), 92–106.

[45] *Pravda*, Apr. 19, 1958.

[46] *VVSh*, No. 6, June 1958, p. 7.

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applicants and provide a rationale for launching the drive to increase the working-class component of the student population, or pseudo-workers: secondary-school graduates with a two-year period of employment as workers.

Although discrimination against applicants based on social origin was officially abolished in 1935, political and security screening has continued. How effective this screening procedure is, is difficult to tell. It has been based primarily on what the applicant said about himself in a written autobiography and on the "character reference" (*kharakteristika*) submitted with his application. Before World War II, the "character references" were required of all applicants, but in the 1940's and early 1950's they were optional, only to be made mandatory again in 1957. They describe the applicant's scholastic performance as well as his "political consciousness" and zeal, and used to be generally obtained by the applicant from the director of his 10-year school or from his former employer. Since the reintroduction of the "character reference" requirement in 1957, references not only from the applicant's former school director or employer, but also from his Komsomol and trade union (whenever applicable) organizations are required. As the representatives of "social organizations" undoubtedly have an influential voice in the admission committees, the new "character reference" system considerably strengthens the sociopolitical screening procedure.

To sum up, prior to 1935 admission standards were dominated largely by political considerations. During the two decades from 1935 to 1955 Soviet higher educational establishments, in theory at least, were admitting students primarily on the basis of academic merit, though even during this period a great many nonacademic, primarily political, criteria were applied in the selection procedure. Yet the fact remains that admission then depended largely on the student's ability to pass extensive and, in many instances, highly competitive entrance examinations.[47] Academic criteria, though they may not have been fully operational, were at least officially sanctioned. From 1955 on, academic criteria as a basis for acceptance to higher education were being gradually undermined by the introduction of new admission policies. By 1960 political considerations rose once again to a position of prominence in the screening process, though in contrast to the period before 1935 the majority of applicants must have completed secondary education and must take qualifying entrance examinations.

3. *The Qualitative Issue: Recent Changes and Debate on the Selection of Higher Education Students*

The modifications in the requirements for admission to higher education in the years since 1955 reflect three major tendencies. One is the increasing rejection of academic achievement exclusively as the criterion of acceptability. The second is corollary to the first and consists of increased reliance on the political record and employment experience of applicants. The third is the differential weighting of the various entrance examinations. All three of these developments serve the same purpose—an officially sanctioned nullification of the heretofore supposedly uniform criteria for admission to higher education. Paradoxically, the reintroduction of criteria other than those of academic merit to admission procedures and the weighting of entrance examinations are now defended by Soviet educational policy-makers as a set of measures designed to restore "more equitable" access to higher education and to make the admission policies "more uniform."

The new trends can be gleaned from the changes in admission rules as they developed since 1954:[48]

Entering Class in the Fall of 1954 and Earlier Years.—Persons with gold or silver medals and honors graduates of semiprofessional schools were accepted without competitive entrance examinations; first priority was given to gold medalists, second priority to silver medalists and honors graduates. All other applicants took competitive entrance examinations. These rules applied equally to recent secondary school

[47] E. Ashby, *Scientist in Russia*, New York: Penguin Books, 1947, p. 71; Sir Eric Ashby, "Soviet Science *Is* a Challenge to Us," *New York Times Magazine*, Apr. 18, 1954.

[48] *Sprav VUZ—1947, 1954, 1955, 1956, 1957, 1958, 1959* and *1960*. The original edition of *Sprav VUZ—1958* did not contain the admission rules; they were issued as a supplement in mid-summer. See *Sovetskaia Rossiia*, June 4, 1958.

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graduates as well as to veterans of World War II, ordinary veterans,[49] older graduates (formerly employed) and all other categories of applicants.

Entering Class in the Fall of 1955.—The initially published rules of admission for 1955-56 were identical with those valid in 1954. However, on June 8, 1955, these rules were suddenly amended. According to the new regulations, *some* institutions of higher education could submit silver medalists and honors graduates of semiprofessional schools to special examinations in the one subject considered to be the most important for the applicant's prospective field of study. Neither the subjects involved nor the institutions which were to conduct these examinations were publicly identified at the time, although applicants reportedly were told of this additional requirement when they filed their applications. Also new was the provision that ordinary veterans and persons with two or more years of gainful employment were to be given priority of admission, "all other competitive conditions being equal."

Entering Class in the Fall of 1956 and 1957.—As before, applicants with gold medals were accepted in all higher educational establishments without competitive entrance examinations and enjoyed first priority. Applicants with silver medals and honors graduates of semiprofessional schools were also accepted without entrance examinations in most schools, except for institutions indicated in a special list of 86 higher educational establishments.[50] Silver medalists and honors graduates who had applied to these 86 institutions—representing 10 percent of all higher educational establishments at that time —were required to take entrance examinations in one subject which was considered most important for their field of study.[51] Veterans of World War II with gold or silver medals or who were honors graduates were accepted without entrance examinations. Persons who had been gainfully employed for two or more years and ordinary veterans had priority over those without such a record, "all other competitive conditions being equal."

Entering Class in the Fall of 1958.—Persons with gold or silver medals and honors graduates of semiprofessional schools were to be accepted "on the same basis as everybody else." All persons (including veterans) had to take competitive entrance examinations in three to five subjects, depending upon field. First priority in acceptances was given to World War II veterans; second priority to persons with two or more years of gainful employment and to ordinary veterans. The proportion of applicants in these two priority categories was not to exceed 80 percent, and the remaining 20 percent of vacancies were to be reserved for general competition of applicants from secondary schools. Persons with gold or silver medals and honors graduates were to be given preference, "all other competitive conditions being equal" (i.e., if their grades on entrance examinations and priority status were the same).

Entering Class in the Fall of 1959.[52]—Veterans of World War II with gold or silver medals or honors graduates of semiprofessional schools were accepted without competitive entrance examinations, except in fields where a special aptitude was to be tested (linguistics, music, sports, the creative arts). All others were required to take competitive examinations in three to five required subjects; grades in the dominant subject or subjects were to be specially

[49] "Ordinary" in the sense that they had served in the armed forces of the U.S.S.R. but had not served in the "Great Patriotic War" (World War II).

[50] These included: 22 universities, economics and jurisprudence institutes; 23 polytechnical, industrial and machine building institutes; 13 mining, metallurgical and construction institutes; seven chemical technology, food and consumer goods institutes; four agricultural higher educational establishments; eight transportation and communication institutes; five medical institutes; four pedagogical and library institutes. Note that this listing of schools with special entrance requirements could be considered an interesting "quality" or popularity indicator of Soviet higher educational establishments. There is also a good deal of similarity between this list and the list of institutions which offered deferment from military service in the 1940's and another list of "*VUZ'y* of the first category."

[51] Any one of the following could have been involved: physics, mathematics, Russian language, foreign language or artistic aptitude, depending upon field of study. For example, engineering students would take an examination in mathematics, and physics students in physics. Furthermore, silver medalists and honors graduates of semiprofessional schools had to receive a grade not less than "good" in this examination subject, and all veterans and persons with employment experience needed at least a passing grade in order to be considered for admission without taking the competitive entrance examinations in all subjects.

[52] Complete translation of the Rules for Admission in 1959 is given in appendix IV–AR.

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weighted.[53] First priority was given to all veterans; second priority to persons with two or more years of gainful employment, preferably in branches of production related to the specialty for which the student was applying. Furthermore, only those who had been employed for two or more years could apply for the specialties of journalism, jurisprudence, literature, philosophy and political economy. Applicants who wished to study medicine, stomatology, pharmaceutical specialties, pedagogy and international relations who had worked for two or more years were given particular priority. The proportion of applicants in the priority categories (save in the specialties mentioned) was not to exceed 80 percent, and the remaining 20 percent of vacancies were to be reserved for general competition among applicants from secondary schools. Gold or silver medalists and honors graduates of semiprofessional schools were given preference, "all other competitive conditions being equal."

Entering Class in the Fall of 1960.[54]—All persons except veterans of World War II who were also honors graduates of secondary schools were required to take entrance examinations.[55] First priority in admissions was given to persons "assigned to study" (*napravlennye*)[56] in higher educational establishments by industrial and construction enterprises and state and collective farms. These candidates must have had two or more years' employment experience,[57] and while they had to take entrance examinations, a passing grade was sufficient for admission. Second priority was given on the basis of entrance examination scores to those who had been employed for at least 2 years and had distinguished themselves on the job (character references from party, management and trade unions), and to veterans. The proportion of applicants in priority categories was not to exceed 80 percent, and the remaining 20 percent of vacancies were to be reserved for general competition. The grades of those taking entrance examinations were to be weighted to give preference to those having the highest grades in the subject(s) considered most important for the future field of study.

In the specialties of journalism, jurisprudence, languages and literatures, philosophy and political economy, only persons with two or more years of prior employment could apply. In most fields of pedagogy, medicine, stomatology and pharmacy, only persons already employed and with practical experience in the respective field were to be admitted. In geology and engineering specialties—mining, metallurgy, chemical technology and other fields where the employment of persons younger than 18 is prohibited—only persons 18 or older could apply. In engineering fields (unspecified) where the employment of women is considered hazardous, women could not apply.

During the academic years 1960–61 and 1961–62 all discharged commissioned officers of the armed forces of the U.S.S.R. with partial or completed higher education were to be accepted without entrance examinations in advanced years of study. Discharged commissioned officers who have completed secondary education—general, civilian semiprofessional, or military—are accepted upon passing the entrance examinations, for which purpose special preparatory courses have been set up. These courses are not only tuition-free, but the students are paid a monthly stipend (no other preparatory courses have such a provision).

The 1960 admission rules also stipulated different dates for the beginning of the school year (depending on the institution involved), and in specialties where "seasonal activity" is a significant factor (chiefly agriculture and construction engineering) the date for filing applications was postponed by several months.

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[53] Thus for students entering a higher educational establishment to study physics, the grades in the entrance examination in physics would be weighted most heavily. For details, see appendix IV–AR and discussion in text below.

[54] *Pravda*, Apr. 6, 1960; *Sprav VUZ—1960, passim.*

[55] Note that the 1958 admission rules, which barred the admission of medalists without taking the competitive entrance examinations, were rescinded in 1959 and 1960 to make allowance for gold medalists who were *also* veterans of World War II to accommodate some of those discharged from military service at the time of the general reduction in the size of the standing army. There were probably not many of these veteran–gold medalists left who had finished school before the end of World War II and were still under 35 years of age.

[56] See further discussion below.

[57] Semiprofessional school graduates except honors graduates could not apply unless they had three or more years of employment; vocational-technical school graduates had to have four. The employment which students in regular secondary schools with production training engaged in could not be considered part of the employment record, but full-time employment (with study in the evening) in alternating shift secondary schools could be so counted.

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This summary shows that within the period of 6 years a new scheme for determining the admission of students to higher education was worked out, a scheme marked by a departure from the previous heavy reliance on academic criteria. While academic criteria have by no means been abandoned, the addition of other criteria has weakened their position. Under the current admission rules, one who is considered "worthy" of higher education can gain admission with a scholastic record inferior to that of someone else considered "less worthy" but who has received high grades in secondary school and high scores on the entrance examinations.

The policy of giving preferential treatment to persons gainfully employed before applying for admission to higher education is further complicated by the fact that the employment is supposed to be in a field similar to that in which the applicant wishes to specialize. This would seem to be an obvious effort to constrain inter-branch or inter-field mobility. The problems raised by this requirement may be exemplified by a recent story in a Soviet newspaper: [58]

I am an ordinary worker. I work during the day and study in the evening. . . . I dedicate all my energy. . . . But now I am in a predicament. I always wanted to be a surgeon. . . . But from the age of 16 I worked in a printing shop, and according to the new rules this line of work allows me to enter only a polygraphic institute. . . . Should I now start on a job in a hospital? . . .

The changes in admission rules in regard to honors students during the period 1954–60 are especially noteworthy. At the root of these changes is the fact that there simply were too many honors applicants and their preparation was not always found to be satisfactory. In fact, there were so many medalists that in 1957 it was felt advisable to limit their admission to not more than 25 percent of the entering class.[59] The grades appearing on the secondary school diploma often did not coincide with the grades which the students received on the entrance examination given by the higher educational establishment.[60]

In the Armenian Polytechnical Institute in 1956, for example, it was found that among 260 applicants who were honors graduates of secondary schools and technicums, 70 failed in the mathematics examination, 50 received only a passing grade, and eight had to be dismissed in the first term for "incompetence." [61] Thus half of the honors graduates were found to be below standard. Among the applicants to Erivan State Polytechnical Institute in 1957, only 32 percent of the silver medalists were able to match their secondary school grades (i.e., "good" or "excellent") on the entrance examinations.[62] Among the 1,720 applicants who took the entrance examinations, only 40 percent scored passing grades or higher, and 60 percent failed in one or more subjects.[63] Examples of this type, as reported in the Soviet press, can be multiplied.

The examinations held by Tadzhik State University in 1956 also exposed disparities in the preparation of rural vs. urban secondary school graduates. There was a marked difference in examination scores, even among the gold and silver medalists, between those who had gone to urban and those who had attended rural secondary schools. In physics, for example, urban graduates could operate instruments, while honors graduates of rural schools reportedly could not even identify them.[64] It is in view of these shortcomings, true or deliberately exaggerated to prompt the change in admission rules, that the debate which began in 1954 in Soviet educational circles is worth noting.

The argument was advanced in 1954 that since the Soviet secondary schools gave "adequate" preparation to students, there was no need for competitive entrance examinations in higher educational establishments at all, and that all qualified graduates should be admitted solely on the basis of their secondary school record. It was argued that entrance examinations in a number of subjects did not serve a useful purpose.[65] The higher education authorities, however, favored continuing the existing system of using entrance examinations as a

[58] Entitled "Institute and Specialty," *Komsomol'skaia pravda*, Jan. 17, 1960.
[59] *VVSh*, No. 6, June 1957, p. 5.
[60] *Zaria vostoka*, Sept. 11, 1956.
[61] *Kommunist* (Armenia), Oct. 2, 1956.
[62] *Ibid.*, Sept. 12, 1957.
[63] Incidentally, this sheds light also upon the applicant-vacancy ratio: 690 passed the examinations, 380 were admitted, making a rejection ratio of 1.8 to 1 vacancy.
[64] *Kommunist Tadzhikistana*, May 12, 1956.
[65] Series of articles in *VVSh*, in the spring of 1954, especially the summary and official position in No. 6, June 1954, pp. 34–38.

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screening device. The Ministry of Higher Education stated that because there was "uneven quality" of grading in the secondary schools, the entrance examinations given by the higher educational establishments were the "most objective form of selecting qualified students," [66] and proposals to use other admission tests, such as computed averages of maturity certificate and entrance examination grades or one vocational subject examination only,[67] were rejected. In the years that followed this debate, many changes were made in admission rules, but the entrance examinations were retained. It should not go unnoticed, however, that their role in the selection procedures has changed: the 1960 admission rules state that the purpose of entrance examinations is to select the "best prepared and most gifted, who receive the highest grades in the major subject" from among those who are "worthy and who have already distinguished themselves in productive employment." [68]

These claims notwithstanding, it is already apparent that the preferential admission of applicants with work experience has in fact resulted in a lowering of academic requirements. Examination results in various higher educational establishments suggest that despite an extensive preparatory course of several months' duration, proportionately many more applicants with work or military experience received merely passing grades (a "3" average: *posredstvenno*) than applicants coming directly from regular secondary schools.[69] (In fact, many applicants with work and military experience received failing grades on the entrance examinations.[70]) Nevertheless, these applicants with barely passing grades were accepted because of their preferred status in place of academically better qualified applicants newly graduated from secondary schools.

This policy is obviously discriminatory against academically qualified applicants. Despite assurances in 1957 by Minister of Higher Education Eliutin that able youths who had just been graduated from the 10-year school, but did not have the desired employment experience, "would not be kept out of higher educational establishments," [71] discrimination against recent secondary school graduates has intensified considerably. The educational reform law itself furthered this discrimination by providing that some institutions may admit *only* applicants with an employment record in a field related to the proposed specialty.[72] Even before Khrushchev announced the educational reform, higher education officials defended the new admission policies as "just." Rejecting the many criticisms which were leveled against the two-year work requirement, V. Stoletov, then Deputy Minister of Higher Education and now the Minister of Higher and Secondary Specialized Education of the Russian SFSR, recommended that the selection of students for higher education should begin long before they actually apply for admission.[73] He advocated preselection of those who showed promise in secondary schools and employment establishments, several years before they were ready to apply for admission. The 2-year employment requirement in this context was said to be a "test" of how dedicated and how adept the prospective student would be. If a student was "sincere" about his quest for knowledge, he would not only retain what he learned, but would also try to improve himself (in night school or by preparatory courses) in order to enter higher education.

Behind this and other proposals to alter the qualitative basis in admission requirements, there is a more fundamental objective than a routine reorganization of admission procedures. The ex-President of the Academy of Sciences of the U.S.S.R., A. Nesmeianov, explained it aptly when he stated that the current system of competitive entrance examinations fails, for:

> they are largely accidental tests. The decisive role in admissions should be played by an objective determination of the ability and inclination of persons desiring to enter a given field of higher education. Therefore, it is exceedingly important to identify the abilities of young people at an early

[66] *VVSh*, No. 6, June 1954, p. 37.

[67] Note that vocational subject tests, actually aptitude tests, in institutes of fine arts, music, architecture and physical culture began to be given in 1954. They were and continue to be supplemental examinations.

[68] *Sprav VUZ—1960*, p. 5.

[69] For example, in the Kiev Institute of Food Technology (*VVSh*, No. 5, May 1958, p. 66).

[70] *VVSh*, No. 9, Sept. 1957, pp. 3–4.

[71] *Komsomol'skaia pravda*, June 2, 1957.

[72] See appendix I-ERL.

[73] V. Stoletov, "K novym uspekham vysshego obrazovaniia" (Toward New Achievements in Higher Education), *Kommunist*, No. 16, April 1958, pp. 72–85.

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stage and develop an overall assessment of aptitude instead of the present method of deciding in the month prior to admission who should enter higher education.[74]

This raises the interesting issue of how "ability and inclination" are to be recognized. Khrushchev has advocated special secondary schools for the education of gifted children in mathematics and the sciences whose special abilities should later "continue to be developed in the respective areas in higher education." [75] On the basis of this proposal, several schemes were developed for the channeling of students especially gifted in mathematics and the natural sciences directly into higher education, without the employment detour.[76] Minister Eliutin gave the matter consideration.[77] Although the whole idea of special education for the gifted was suspended,[78] changes were made in admission policies for entry into higher education which essentially recognized the problem. The introduction of differentiated and subject-weighted achievement examinations for applicants seeking entry to higher education go part way toward dealing with this matter. But the larger issue, namely the early recognition and development of abilities, remains unsolved.

The new policy of admitting applicants to higher education after two or more years of work experience has revived preparatory-course activity. In the 1930's a number of higher educational establishments set up preparatory courses (*kursy po podgotovke v VUZ'y*) for those who had completed secondary education but were required to pass examinations for admission to higher educational establishments.[79] It was common practice for an institution of higher learning to offer in the summer these two-month preparatory courses for its own applicants who were scheduled to take the entrance examinations in August. All "worker preparatories" went out of existence in the late 1930's, but summer preparatory courses for examinations still are given by many higher educational establishments.

Beginning in the fall of 1955, as the number of applicants with work experience began to increase, individual higher educational establishments began to offer their applicants refresher courses lasting the entire academic year. Since 1958 there have been two types of such courses: the full academic year course (10 months) and the summer course (2 months). In addition to the special preparatory courses offered by individual universities and other higher educational establishments, special lecture series are offered by the Society for the Dissemination of Political and Scientific Knowledge.[80]

The preparatory courses of the individual higher educational establishments are often supervised by their Komsomol organizations which select promising youths at their place of employment for entry.[81] The program of the preparatory group in one of the elite engineering schools, the Bauman Higher Technical School in Moscow,[82] is perhaps illustrative of the scope and activity of many other such courses, even though the programs vary from one institution to another. The students enrolled in the course in 1959 had been out of school from two to 15 years; the majority had worked for over 7 years. Of 2,000 applicants, 1,000 students were accepted. Lasting 7 months, the course offered four instruction hour sessions three or four times a week for a total of not more than 400 instruction hours. There were two divisions, one for applicants to the regular (day) program, and the other for those planning to attend the evening program. In the day program division, 154 hours of mathematics were offered, 96 of physics, 80 of Russian language and literature, and 70 of a foreign language. Thirty to 40 percent of instruction time was devoted to lectures, the rest to "exercises and drill, just as in secondary school."

Although the preparatory program calls for several weekly sessions of 4 hours each, individual higher educational establishments (the

[74] *VVSh*, No. 1, Jan. 1959, p. 19.
[75] *Pravda*, Sept. 21, 1958.
[76] *Ibid.*, Oct. 17, Nov. 19, 1958.
[77] *Ibid.*, Sept. 17, 1958.
[78] According to the President of the Academy of Pedagogical Sciences of the RSFSR: "The matter deserves further study." (*Ibid.*, Dec. 25, 1958).
[79] Not to be confused with the "worker faculties" (*rabfak*), established at the same time and designed to prepare for admission to institutions of higher education persons *without* secondary education.
[80] *Sovetskaia Estonia*, Aug. 4, 1957.
[81] *Sovetskaia Litva*, Feb. 5, 1957. There are frequent articles about Komsomol brigades mobilizing working youth to complete secondary school and then take the preparatory courses for higher education (e.g., *Rabochaia gazeta* [Ukraine], Nov. 14, 1959).
[82] *VVSh*, No. 1, January 1959, pp. 72–73.

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Kaunas Polytechnical Institute and the Vilnius Pedagogical Institute, for example) have reduced the time to one-half or even one-third.[83] Also, in the Lithuanian SSR, preparatory courses were available in only five large cities and many potential applicants could not enroll. Of those who enrolled in the preparatory course offered by the Kaunas Medical Institute, less than one out of three was able to pass the required entrance examinations.[84] In the preparatory courses at Gor'kii University there were reportedly "many casual characters" who had "previously failed the examinations for admission to higher educational establishments," but who were still trying "at all costs" to get admitted.[85]

The requirement of prior employment as a condition of preferential admission status has led many youths to take production jobs in industry or agriculture merely to fulfill the requirement. This has not always produced satisfactory results. A typical news item disclosed, for example:

> We cannot hide the fact that many boys and girls go to work in production upon completion of the 10-year school for the sole purpose of gaining "production experience" credit. They perform their jobs in production dishonestly and carelessly, viewing them as more or less temporary occupations.[86]

In addition, from every corner of the U.S.S.R. reports appeared that "many of the certificates of work experience issued by the heads of offices and enterprises were fraudulent." [87] While some institutions cited only isolated cases, others reported the existence of "rings" dealing in forged documents. Authorities in the Georgian SSR were reported to have "cracked" such "rings" involving a number of institutions and scores of persons.[88] Widespread evidence of "bribes to third parties" for issuing work experience certificates to higher education applicants was also discovered.[89] Similarly, it was reported that "very serious irregularities in admission procedures" were uncovered in Armenia.[90] In the Kazakh SSR it was decried as early as 1956 that "improper practices in selecting students should no longer be tolerated." [91] In the Azerbaidzhan SSR widescale fraud in work certificates was reported in 1958.[92] Sometimes the forged work books were given them by relatives.[93] The chairman of the committee on admissions of the Omsk Medical Institute in Western Siberia was convicted "for the systematic acceptance of bribes." [94] Obviously, parents, other relatives and friends will go a long way toward helping youths gain admission to higher education. One wonders, however, if the real culprit is not the restrictive admission policy itself. The placing of party, Komsomol and trade union representatives on admission committees is justified by the need for cutting down the "abuses" [95] such as those discussed above.

The latest step in the drive to make higher education more accessible to experienced workers and peasants was taken in 1959. In August of that year, in discussing the need for further expansion of training engineers for the mechanization of agriculture, *Pravda* suggested two alternative paths: (1) direct selection and assignment to study of the most promising persons from among collective farmers and workers on state farms, and (2) expansion of training through the existing system.[96] It was recommended that preference be given to the first idea, and that if the necessary preparation was lacking, "deserving" individuals be sent to preparatory schools. This discussion opened a campaign of proposals demanding that individual

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[83] *Sovetskaia Litva*, April 3, 1959. The preparatory instruction program was offered in subjects in which examinations were given at a particular higher educational establishment and the program was based on regulations issued by the U.S.S.R. Ministry of Higher Education.

[84] *Idem.*

[85] *Komsomol'skaia pravda*, Nov. 24, 1959.

[86] *Kommunist Tadzhikistana*, Nov. 5, 1958 (feature story), p. 3. See a similar article in *Komsomol'skaia pravda*, July 12, 1959 (a case where the Komsomol's recommendation for admission was withdrawn).

[87] *Kommunist* (Armenia), Sept. 8, 1957, an article concerning false documents from various sections of the country discovered by Erivan Polytechnical Institute. See also *VVSh*, No. 5, May 1958, p. 67, for similar discoveries by an engineering school in Kiev.

[88] *Zaria vostoka*, Dec. 24, 1957.

[89] *Ibid.*, July 29, 1958.

[90] *Kommunist* (Armenia), Jan. 26, 1958. Incidentally, this story also reported that in 1957–58 Armenians born abroad (i.e., repatriated by the Soviet Government) were admitted to higher educational establishments "for the first time."

[91] *Kazakhstanskaia pravda*, July 5, 1956.

[92] *Bakinskii rabochii*, Sept. 9, 1958.

[93] *Kommunist* (Armenia), Sept. 19, 1958.

[94] *Sovetskaia Rossiia*, Jan. 18, 1957. A case of bribery involving a professor and a mother seeking admission for her daughter who was an honors graduate but had failed the entrance examinations was reported in Moldavia (*Dnestrovskaia pravda*, Sept. 27, 1959).

[95] *Eliutin-VSSS–1959*, p. 87.

[96] Aug. 21, 1959.

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plants [97] and collective farms [98] choose from among their own employees students to be sent to higher educational establishments. On September 20, 1959, the Soviet Government "responded" by promulgating an extremely important measure affecting the selection of students for higher education and secondary specialized schools.[99]

This new law—the most radical yet enacted in that field—gave to industrial and construction enterprises, offices, and collective farms the right "to choose their own candidates to be sent directly to study in higher or secondary specialized establishments." Economic enterprises and collective farms are to pay their "assignees" (*kommandirovannye*), "grantees" (*stipendiaty*) or "deputized" (*poslantsy*) students stipends 15 percent higher than would ordinarily be given by the institution involved. The rationale for this measure was contained in the decree and elaborated in press reports which followed.[1] The new procedure was said to allow for a more "satisfactory selection" of the "most deserving and able students" and enable economic units to plan their own requirements for specialized manpower and select students accordingly. Funds supplied by the enterprise will support these young specialists, and if they fail to prove themselves, support can be withdrawn. Specialists who complete their study will be "under legal obligation" to return to employment in the enterprise or collective farm which originally sent them to school. Local economic units will be able to see to it that no money or effort is wasted in training their "new leaders." To make sure that such students have no difficulty entering higher education, they are termed "extraordinary students" and are to be admitted to professional study on a priority basis (see 1960 admission rules, above).

As a result of this new law, which went into effect beginning with the academic year 1960–61, the role of the Communist Party, the Komsomol and the trade union organizations in the selection of students has been very much strengthened, for the local organizations of these bodies are charged with the responsibility of drawing up lists of the workers and peasants who are to be "deputized" for study in technicums and institutions of higher education.[2] After the prospective candidate has been thus selected, his qualifications are discussed at a general meeting of the "social" organizations. Upon approval, he is sent to one of the preparatory schools set up specifically for this purpose by the republic ministries and committees of higher and secondary specialized education. These schools are "to accept on a first priority basis those assigned to study by plants and collective farms." [3]

There may be a temptation to interpret the present Soviet moves as a step toward greater egalitarianism if the present admission criteria are compared with those which based admission on largely academic considerations (which doubtless favored the descendants of the better educated strata of society). It would seem, however, that the new admission rules are in fact neither more "egalitarian" nor more "democratic." Even if they were intended as such, they would not necessarily have the desired effect from an operational point of view.

In the first place, those considered the "best educated" can still gain direct access to higher education in select engineering and science fields. Those one category below the "best," but still "well educated," must detour their path to higher education via "productive work experience." All applicants to higher education, however, must have a secondary education, a requirement which the true "worker" cannot fulfill.

In addition, political preselection is bound to serve the interests not of the more able students from the working class, but of those who already belong to the privileged strata of Soviet society. The relaxation of purely academic criteria may very well work in the opposite direction, restricting admission to higher education to "worthy" descendants of the privileged class. How can the son of a plant director in good political standing, after having worked for a couple of years, fail to be "deputized" to go on to school? The same would hold for the offspring of party secretaries and other top bureaucrats. In the past, such persons would have to compete for admission to higher education

[97] *Izvestia*, Sept. 11, 1959.
[98] *Ibid.*, Sept. 13, 1959.
[99] *Pravda*, Sept. 20, 1959.
[1] *Izvestia*, Oct. 23, 1959.
[2] *Idem.*
[3] *Idem.*

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largely on the basis of academic merit. Under the new rules, however, they receive preferential treatment because of their production record or of party and Komsomol recommendations, and can be admitted with lower entrance examination records than would be required under the original rules. The real test of the new preselection scheme will turn around the question of whether a worker on the bench really has a chance to compete for higher education. Propaganda notwithstanding, there are as yet no indications that this is actually the case.

The changes in admission rules make more sense if they are considered as a device forcing Soviet secondary school graduates into the involuntary detour of production employment. They make even greater sense as instruments of political control, which was on the decline for two decades, but has again asserted itself. Soviet history has already shown in the late 1920's and early 1930's how destructive to the aims of education a politically inspired admission policy can be. Whether the new selective process based on strong political control constrained by a measure of academic discrimination succeeds is still too early to determine. But political loyalty and academic excellence do not by any means necessarily go together.

4. *The Qualitative Issue: Entrance Examinations*

Academic merit, as a condition of admission to higher education, can be practically determined on the basis of the student's past records and some sort of entrance examination. Basically there are two types of such examinations: achievement tests and aptitude tests. Achievement tests are designed to show what a person knows in any given subject, or at least what he is able to "score" by supplying the right answers to objective questions. Aptitude tests are designed to reveal the areas of a person's highest comprehension; they may also reveal what a person can "score" in various subjects weighted by a preassigned "standard." In the last 25 years Soviet higher education has relied exclusively upon achievement testing in several subjects for the selection of its students, and aptitude tests were banned officially in 1936.

Entrance examinations for Soviet higher educational establishments are either oral (about 15 to 20 minutes) or written (two hours), or both. Prior to 1955 both types were uniformly required in two subjects: Russian language and literature, and mathematics. In other subjects examinations have usually been oral. In 1955 the oral examination in Russian language and literature for entrants in all fields except the humanities was abolished. In mathematics the practice seems to vary; in 1959 and 1960 either the written or the oral, or both types of examination, were given. In addition to the examinations in Russian language and literature and mathematics, oral or written examinations are given in one to three other subjects, depending upon field. In such fields as the arts, architecture and music, a vocational subject (performance) test is also required. Finally, those who apply to an educational establishment where instruction is not conducted in Russian (there are a few institutions of this type, primarily in the field of pedagogy) must pass an examination in the language in which the instruction is conducted. Detailed descriptions of entrance examinations required for the various fields of study, as well as the general contents of subject material covered on the examinations, are availabe for several years in the 1950's.[4] For purposes of this discussion, however, it is sufficient to sum up the pattern of examinations for a recent year (1960).[5]

The emergence of differentiated sets of examinations for admission to Soviet higher educational establishments is exemplified by the fact that required entrance examinations vary from institution to institution. Some schools demand a "hard" set of examinations in five subjects, including sciences and mathematics; others are satisfied with examinations in three of the "easier" subjects—geography, history and language.

There are altogether seven subjects in which achievement tests are given; examinations in three to five subjects may be required of in-

[4] *Sprav VUZ* for various years. For 1953, a convenient summary is available in English in Gorokhoff, *Materials*, pp. 77–82; for 1955, there is a discussion in Korol, *Soviet Education*, pp. 178–86, 447–49. In general, most Western observers agree that Soviet higher education entrance examinations in some fields, notably mathematics, are more comprehensive than American college board examinations.

[5] Appendix IV–AR gives the rules for 1959; about the same pattern of examinations prevailed in 1960.

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dividual applicants, depending upon the institution and particularly the field of intended study. These subjects are:

1. Russian language and literature (required of all applicants)
2. Mathematics (for applicants in engineering, technology, architecture, natural and physical science fields, and economics)
3. Physics (for applicants in engineering, technology, architecture, agriculture, biology, natural and physical science fields)
4. Chemistry (for all applicants listed in (3) above)
5. History of the peoples of the U.S.S.R. (for applicants in all fields of the humanities and social sciences, pedagogy and the arts)
6. Geography (for all applicants listed in (5) above)
7. Foreign language (either German, English or French, for applicants in all fields except agriculture, the arts, and some fields of pedagogy)

In 1960, then, four entrance examinations (in Russian language and literature, mathematics, physics, and a foreign language) were required of applicants intending to enter engineering, technical and natural and physical science fields. Some university programs in certain fields of the natural sciences and some engineering fields required a fifth subject—chemistry. In the humanities and the social sciences, examinations in three or four subjects had to be taken, geography and the history of the peoples of the U.S.S.R. replacing mathematics, physics or chemistry as the required subjects.

The subject composition of the examination requirements has been varied somewhat during the last 20 years. From time to time a subject has been dropped (i.e., chemistry in some engineering schools) or added (mathematics in several instances). The most radical innovation of recent years is the weighting of examination grades according to the student's intended specialty. This system came into general usage in the fall of 1959, though indications of the practice were apparent as early as 1957. In that year "honors" applicants were required to take an examination in only one subject—the most important to the field of study they planned to enter. (In the 1940's and early 1950's all "honors" graduates were accepted without taking any entrance examinations at all.) In 1960 of the three to five examinations every applicant was required to take, the grades on one to three of the major ones (*profiliruiushchie predmety*) were weighted. In other words, if all of the examinations were passed, applicants receiving higher grades on the weighted ones were given preference.

How this new system operates may best be illustrated by an example. A student applying to a university to study physics must take four entrance examinations: physics, mathematics, a foreign language, and Russian language and literature. The first two are considered the most important for his field of study and the grades received on them are therefore weighted. An applicant who receives excellent grades in all four subjects is obviously in the top rank. An applicant who receives an excellent grade in either physics or mathematics, a good grade in the other of them, but only passing grades in the other two subjects is in higher standing than an applicant with two excellent grades in the last two examinations but only good grades in physics and mathematics. An applicant with good grades in both the physics and mathematics examinations but only passing grades in the other two is also in higher standing than an applicant with two excellent grades in the other two but only a passing grade in either physics or mathematics. Finally, a person with one good grade in either physics or mathematics is in higher standing than a person with two excellent grades in the language examinations and passing grades in physics and mathematics. Thus a person who does well in physics and mathematics but gets only passing grades in the other two subjects will invariably be in higher standing than a person with two excellent grades in the languages but not as high in the two subjects considered most important for his future specialty, in this case, physics and mathematics.

This example illustrates that under the "weighted" system a person with a smaller total number of points but higher grades in the "important" subjects is rated higher for admission purposes than a person with a higher number of total points but lower grades in the "important" subjects. Although the weighting system is obviously not the same as the aptitude testing used in the United States, it does represent a radical departure from the earlier Soviet policy of relying upon uniform weights in all examination subjects. It recognizes that

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some persons may have greater ability in mathematics or physics than in the humanities, and vice versa in the case of applicants to philology, language specialties, etc.

Each year the Ministry of Higher and Secondary Specialized Education announces what materials, based on the secondary school curriculum, are to be covered in the entrance examinations.[6] The instructions to the student as to how to prepare for each examination are detailed.[7] Individual institutions make up their own examination questions and can thus vary their own standards for admission. A mathematics examination is markedly more difficult in a top-notch engineering school or physics-mathematics division of a university than in a second-rate engineering school, or an economics or pedagogical institute. The guide for entrants to Leningrad University specifically states: "To receive high grades, most essays [in Russian literature] must show a knowledge which is substantially more extensive than that required by the secondary school program." [8] The make-up of the individual examinations, then, and their weighting, account for the differentiated standards of admission to Soviet higher education, the former in effect for over three decades, the latter an entirely new factor.

The Soviet press often complains that the entrance examinations require more knowledge of a given subject than is imparted in the secondary schools. It is, in fact, a subject of controversy in Soviet education what significance the entrance examinations actually have: are they indicative of poor preparation on the part of the secondary schools, or, in the case of certain institutions, excessive in their requirements? Numerous articles in Soviet pedagogical journals and newspapers are devoted to these questions, and in the Soviet press there are frequent reports about the "shortcomings" of preparation of higher education applicants.[9] For example, the entrance examinations given by Moscow State University in 1955 showed that although many students knew their subjects, some could not write a good essay (in Russian literature), could not spell, or made grammatical errors. In mathematics and physics they were reportedly so inadequately informed in fundamentals that 22 percent of the applicants in some divisions received failing grades and 50 percent managed to score only a passing grade.[10] The point was raised, however, that most of the mathematics questions were posed in unusual form, "unfamiliar" to most secondary school graduates. Yet there have been other instances where the students "did not even know simple fractions." [11]

The withdrawal of preferential treatment for "honors" graduates elicited disclosures that the secondary schools were too "liberal" in their grading [12] and even permitted "cheating," [13] so that secondary school certificates could not necessarily be considered "true" indicators of the student's knowledge. Undoubtedly there are some poorly prepared secondary school graduates; yet the wholesale denunciations give rise to suspicion that their publicity may be intended to justify the changes in admission procedures and thus to advance the new version of admission policies.

5. *The Quantitative Issue: Supply of Applicants and First-year Admissions*

The recent changes in admission policy by Soviet institutions of higher education can be explained in part by the growing output of Soviet secondary schools. In the early 1930's there was an absolute lack of secondary school graduates qualified to enter higher education. In the late 1950's the situation was reversed: the higher educational institutions could not accommodate the surplus of 10-year-school graduates and the Soviet Government was not willing to expand full-time higher education. Until the

[6] *Sprav VUZ* for individual years. Pamphlets for individual subjects are also published.

[7] See Leningradskii Gosudarstvennyi Universitet (Leningrad State University), *Kak gotovit'sia k priemnym ekzamenam v VUZ:* [subject] (How to Prepare for Entrance Examinations for Higher Educational Establishments [in a given subject]), Leningrad, 1960. There are pamphlets for every subject required on the entrance examinations.

[8] *Ibid.* (guide for Russian language and literature), p. 53.

[9] For a succinct summary, see I. D. London, "Evaluation of Some Current Literature about Soviet Education," *School and Society*, Vol. 86, No. 2140, Nov. 8, 1958, 9–16.

[10] *Narodnoe obrazovanie*, No. 2, 1955, pp. 28–33. See also *Kommunist*, Oct. 2, 1960: 50 percent of the Armenian republic's total applicants failed the physics and mathematics entrance examinations.

[11] *Pravda vostoka*, Feb. 7, 1960 (Tashkent State University, 1959 examinations).

[12] *Ibid.*, Nov. 29, 1959, gives a long account of poor mathematics preparation, with follow-ups in the issues of Dec. 4 and 8, 1960.

[13] *Ibid.*, Feb. 7, 1960.

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early 1950's the application of academic selection criteria was sufficient to control the modest surplus, but as the supply of qualified applicants kept increasing in the second half of the 1950's, the Soviet regime decided, on the one hand, to apply sociopolitical criteria in screening applicants and, on the other, to revise the system of entrance examinations to limit direct access to strategic science fields primarily to those who showed exceptionally great ability in such fields.

Supply of Applicants.—After the regular 10-year school structure emerged in the mid-1930's, its graduates gradually began to replace other types of applicants to higher education,[14] and by the late 1930's the secondary school had become the primary source of candidates for higher education. While in the mid-1930's only about 15 percent of entering students came from regular secondary schools (there simply were no more graduates available), by 1939 secondary-school graduates already comprised about 60 percent of all students admitted.

During World War II there were considerable difficulties in recruiting and retaining students.[15] The attrition rate of first-year students increased considerably, for some students volunteered for military service and others were drafted for work in defense plants. Furthermore, during the first year of the war even students in their third and higher years of study (except for those in a few select engineering fields) could be drafted into the armed services. Because of the continuing flux of personnel, students were being admitted throughout the entire calendar year. In 1942, however, military draft calls of higher education students who were nearing completion of their studies were terminated and some former students were demobilized to permit them to resume their studies. Nevertheless, selectivity in admission policy remained "relaxed" throughout the war and the proportion of students coming directly from secondary schools is difficult to estimate during this period.

After the war the share of secondary school graduates among students accepted for higher education kept growing rapidly. In 1945, 10th-grade graduates accounted for 80 percent of all admissions (see appendix table IV–A–0); by the mid-1950's their share rose to about 90 percent. (In the engineering fields the proportion of regular 10-year school graduates has always been higher, exceeding 70 percent as early as 1938). Until 1955 this course of development facilitated the enforcement of the principle of academic selection. Since then, however, the surplus of applicants has come close to being unmanageable, and as a result even secondary school honors certificates were repudiated and the state began to search for new selection methods and various devices for channeling secondary school graduates into employment.

Although between the late 1930's and the early 1950's the Soviet press sometimes charged that admission committees were too liberal, the choice of applicants was so wide that on the whole selective procedures prevailed. Honors graduates were admitted to higher education without entrance examinations and there was no reference to their "worthiness" of this preferential treatment. Most of the 166,000 students accepted in 1938 came from secondary schools and only 16,000, or less than 10 percent, were admitted as honors graduates.[16] Even in that year two or three candidates were competing for each vacancy in many higher educational institutions.[17] A year later, in 1939, admission was gained by 180,000 of the 300,000 who had applied,[18] about 12,000 honors graduates among them. In 1951 there were more than two applicants for each vacancy, and of 355,000 admissions, only 31,000, or less than 10 percent, were medalists accepted without examinations.[19] On the whole, then, it may be said that in the late 1930's and again in the early 1950's at least one—and possibly more than two—10-year school graduates were available each year for each vacancy in higher education, and 10 percent of them, or less, were honors graduates eligible for admission without entrance examinations. Prior to the mid-1930's and during the 1940's there was less than one secondary school graduate for each vacancy.

[14] See appendix table IV–A–0.
[15] For an unusually frank description of wartime conditions in higher education, see Demenev and Dobrovol'skii, *op. cit.*, pp. 61–62.
[16] *Pravda*, Aug. 28, 1938.
[17] *Ibid.*, Sept. 1, 1938.
[18] *Ibid*, Sept. 2, 1939.
[19] *Komsomol'skaia pravda*, Sept. 1, 1951.

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In 1954, however, many establishments reportedly received three to four applications for each vacancy.[20] The sudden swell of secondary school graduates came about as a result of the expansion of secondary schooling to accommodate the growing number of pupils in the upper grades of the 10-year school, the propaganda-stimulated quest of Soviet youth for education, and the easing, particularly from 1954 on, of academic requirements in secondary schools. Where prior to 1950 less than 8 percent of those who had entered first grade ten years earlier succeeded in graduating, by 1956 the proportion had reached about one-third. In both 1957 and 1958 the number of students graduated from regular 10-year schools was about 1,300,000,[21] almost six times the number graduated from regular schools in 1950. To this number must be added the graduates of evening schools for working and rural youth and for adults, who in 1958 totaled almost 300,000, as compared to only 22,000 in 1950. Most of the revisions in the admission rules were initiated at the time this huge numerical swell of potential secondary school graduates desiring entry into higher education was making itself evident.[22]

The disparity between the annual flow of secondary school graduates and annual admissions in higher education is illustrated in chart XIV. In 1950 and the years before, every graduate of the Soviet 10-year school had a very good chance of being admitted to a higher educational establishment. In 1950 the regular 10-year schools graduated about 220,000 while the number of admissions in regular (day) higher educational establishments was about 230,000. The next few years, however, witnessed a spectacular change in this ratio. By 1956 there were almost 1,200,000 regular 10th grade graduations, but acceptances in regular (day) higher education remained almost the same (231,000). In other words, the ratio of 10-year-school graduates to admission quotas of higher education rose from less than one-to-one to five-to-one in the short period of 6 years. The situation eased somewhat in 1959 and 1960, with a ratio of three-to-one, but this did not significantly affect the disparity.

In addition, the backlog of those desiring further education continued to mount each year, for students not admitted one year sought admission the following year. According to Khrushchev,[23] during the period 1953–57, some 2,200,000 10-year-school graduates failed to gain admission to higher educational establishments or to the secondary specialized educational establishments which had been set up to accommodate them. (See discussion in ch. III.) Nor did such measures as the increase in extension-correspondence admissions and the channeling of 10-year-school graduates into technicums alleviate the pressure significantly.

The introduction of preferential admission clauses for those with two or more years of gainful employment and for demobilized military personnel in the late 1950's further increased the backlog of applicants. Many persons who had graduated some years before, now became eligible, under the new rules of admission, for preferential treatment. The influx of these persons dissipated whatever easing may have occurred because of the decrease in the number of secondary school graduates in 1959 and 1960. In the early 1960's, when there will be further decline in the number of secondary school graduates, the present backlog should ease somewhat though not be eliminated.

Along with the increase in total number of secondary-school graduates in the mid-1950's, there was an increase in the number of honors graduates. Assuming, on the basis of earlier ratios, that the proportion of secondary school honors graduates in 1956 was about 12 percent of the total, then about 150,000 honors graduates were, under existing rules, exempt from entrance examinations. This number alone could account for one-third of total admissions. Added to this number should be the honors graduates of earlier years as well as those who had graduated with honors from secondary semi-professional schools. If, as is likely, many of this group applied for admission, the higher educational establishments were deluged with applications. In fact, 1956 was probably the peak year for admitting "medalists" to institutions of higher education without entrance ex-

[20] *VVSh*, No. 9, Sept. 1954, p. 1.
[21] Appendix table II–C–1.
[22] In 1959 and 1960, however, for reasons discussed in chs. I and II, the number of regular secondary school graduates declined to 1,100,000 and 700,000, respectively. The number of graduates from schools for working and rural youth remained about the same.
[23] *Pravda*, Apr. 19, 1958.

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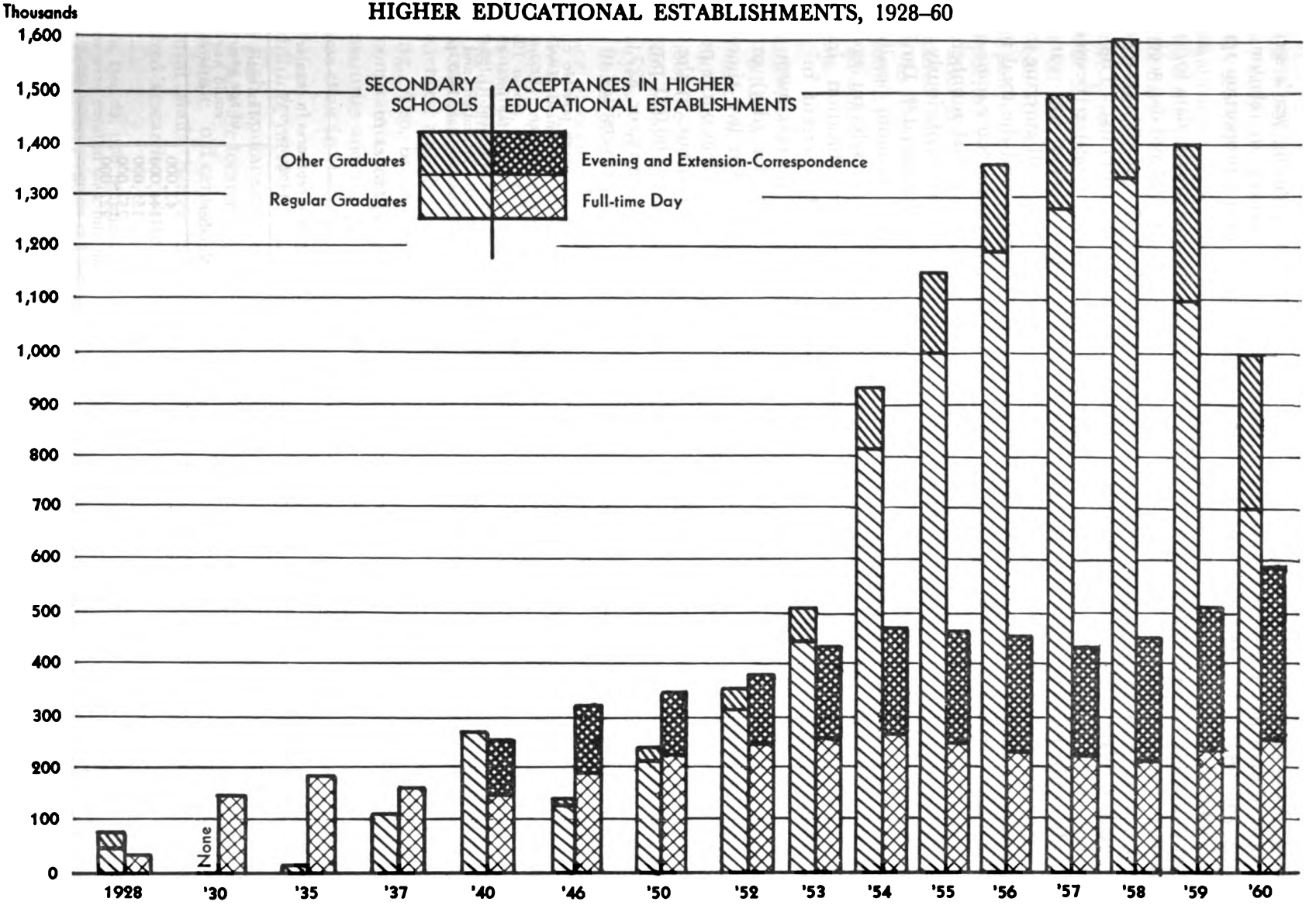
CHART XIV.—SUPPLY OF SECONDARY SCHOOL GRADUATES IN RELATION TO NUMBER OF ACCEPTANCES INTO HIGHER EDUCATIONAL ESTABLISHMENTS, 1928–60



Sources: Appendix tables IV–A–1–A, IV–A–1–S and II–C–1. Note: Acceptances to higher educational establishments refer to day divisions; total acceptances include day, evening and extension-correspondence entrants.

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aminations. Some institutions reported that up to 40 percent of their new enrollment consisted of honors graduates.[24] Thus, the proportion of accepted "honors" applicants rose from about 10 percent in the late 1930's and the early 1950's to about 30 or 40 percent by 1956. Obviously, this trend had to be checked, and it was to a large extent for this reason that a 25 percent limit among total admissions was imposed on honors graduates in 1957.[25] A year later, either because of the reluctance of Soviet authorities to accommodate these applicants or because the "honors" graduates were in fact poorly qualified academically, a campaign was undertaken to discredit them, and their privilege to enter higher education without taking entrance examinations was withdrawn altogether.

An examination of the number of first-year admissions in relation to population figures for the appropriate age level throws additional light on recent changes in Soviet policy with respect to admissions. (This approach can be based only on hypothetical assumptions, for Soviet authorities do not release information on the age of entering students.) During the period 1955–59 total first-year acceptances in all programs of higher education study (day, evening and extension-correspondence) could hypothetically equal only one-third of a given year's secondary school graduates. First-year admissions in the day program were substantially smaller: about one-fifth of the corresponding year's secondary school graduates. However, in relation to the appropriate age-group the proportion was even lower.

Table IV–11 summarizes the data for selected years relating first-year total and day acceptances to the population of 17- (or 18-) year-olds (assumed normal age for entrants). The figures show a hypothetical relationship between the maximum possible number of first-year admissions for the age group (if all entering students were in that age group) and the total number of persons in this age group. Since some of those admitted are older, the actual number of 17- (or 18-) year-olds admitted is obviously smaller than the total number admitted.[26] During the last three decades, the maximum possible proportion of members of the relevant age group entering Soviet higher education increased about 10 times, from 1.3 percent in 1928 to 13.4 percent in 1959. The maximum proportion of admissions to regular (day) programs, however, increased less than five times, from 1.3 percent in 1928 to 6 percent of the pertinent age group in 1959. In contrast, in the United States, 32 percent of the 2,600,000 population of 18-year-olds in the country, or 827,000, entered U.S. colleges and universities in 1959.[27]

[24] *Sovetskaia Belorussia*, Sept. 2, 1956. The Belorussian State University at Minsk, for example, admitted a total of 1,475 students, of whom 40 percent were gold and silver medalists.
[25] *VVSh*, No. 6, June 1957, p. 5.

[26] The figures refer to the maximum possible number in the entering classes in relation to population. If we compare, again hypothetically, the total enrollment (1959–2,267,000) with the population of 17–21-year-olds (about 19,000,000), the proportion would be 11.9 percent for total enrollment and 6.2 percent for regular day enrollment (1,180,000).
[27] U.S. Department of Health, Education and Welfare, Office of Education, *Higher Education*, Jan. 1960, p. 9.

TABLE IV–11.—*Relation of first-year higher education acceptances to population of 17-(or 18) year-olds, 1928–59*

Year	Population of 17- (or 18) year-olds	First-year acceptances, total		First-year acceptances in regular (day) programs only	
		Number	Maximum percent of age group which could have been admitted	Number	Maximum percent of age group which could have been admitted
1928.....	3,400,000	43,000	1.3	43,000	1.3
1930.....	3,500,000	144,000	4.1	144,000	4.1
1940.....	3,200,000	263,000	8.2	155,000	4.7
1955.....	4,300,000	461,000	10.9	257,000	6.0
1959.....	3,800,000	511,700	13.4	227,000	6.0

Sources and Notes: Appendix tables II–A–4, II–A–5, and IV–A–1–S. The population is for one age group—17- (or 18-) year-olds. The percentage is the maximum proportion of acceptances of persons in the age group; in reality, the percentage is smaller. (See text.)

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Of the 225,000 who entered regular (day) programs in Soviet higher education in the fall of 1960, only 50 percent came directly from secondary school,[28] the remainder being persons with employment experience or veterans. In relation to the number of graduates from regular secondary schools (700,000), *only one out of seven* continued on to higher education without interruption. The number of 18-year-olds was about 3,180,000,[29] and thus only about 3.5 percent of the pertinent age group entered higher education. The recent changes in admission policy have thus reduced considerably the proportion of those continuing education directly after graduation from secondary school as compared with 1955, when most first-year entrants to regular day programs (257,000) were secondary school graduates entering directly; they constituted 6 percent of the appropriate age group.

Inter-Institutional Differences in Selection Ratios.—While the total supply of applicants for institutions of higher learning depends largely on the total flow of graduates from the secondary schools, the admission problems of individual establishments are conditioned by many other factors. As shown earlier, a Soviet student's choice of specialty is closely related to his choice of occupation. The most desirable occupations in the Soviet Union are mainly in the technical, engineering and science fields. They command higher salaries and offer prestige and status advantages. Professional occupations in the areas of agriculture, medicine, law, the social sciences, and the humanities are far less rewarding. Also, because of political and ideological constraints, creative professional work in the humanities and the social sciences is more hazardous than in the natural sciences or engineering.

In addition, there is the factor of the traditionally high reputation of some establishments, most of which are located in large urban centers. Many of these "old centers" have better trained professorial staffs, better facilities, and better established research traditions. They also offer higher stipends, better dormitory accommodations, and their graduates often, at least initially, may be placed in better jobs. In addition, they offer the attractions of a large city and, for those who live at a distance, the opportunity to travel.

These different factors, singly or in combination, explain why large universities in metropolitan centers and institutions training specialists in the privileged occupations attract the largest number of applicants. In some instances, these institutions reported from five to twelve applicants for each vacancy even in the years when the total supply of secondary school graduates was relatively small. Conversely, small provincial institutions have had more vacancies than applications. This situation was commonplace before World War II. Today, although the vacancy/applicant imbalance of the smaller institutions has been greatly reduced, the differences still remain. Table IV–12, listing the ratios of applicants to vacancies for a random selection of institutions, illustrates the point.

It may be noted that in general the supply of applicants for admission available to any particular institution is likely to affect its long-run academic standards. Institutions which are large, highly reputable, favorably located in large cities or prominent for the "desirable" specialties offered, enjoy the most favorable ratio of applicants to admission quotas. This excess of applicants is undeniably an asset in setting and maintaining standards in the selection of students. The high caliber of students in turn enhances their general academic standards. Smaller, provincial establishments, on the other hand, have limited choice in the selection of students. When, for example, Moscow State University has four candidates for each vacancy and the Michurinsk Pedagogical Institute has 100 vacancies and only 52 applicants, the standards of selection for the two institutions are bound to be different. Despite the overall excess of applicants in recent years—most institutions had ratios of from 3:1 to 10:1—some higher educational establishments did not have a sufficient number of applicants to fill the available vacancies.

Some of the older, well-established Soviet institutions of higher learning, particularly the well-publicized Moscow State University, as well as such first-class engineering schools as the Mos-

[28] *Pravda*, Dec. 23, 1960 (Eliutin). Actually, even a smaller proportion were enrolled on a full-time basis, i.e., only those in science fields whose programs call for full-time study during the first three years.
[29] Appendix table II–A–4.

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TABLE IV–12.—*Ratio of applicants to vacancies in various Soviet higher educational establishments, 1956–59*

Year	Name of Institution	Number of applicants	Number of vacancies (admissions)	Ratio
1956	Azerbaidzhan State University (*Bakinskii rabochii*, 7–28–56)....	2,000	577	3:1
1956	Azerbaidzhan Medical Institute (*Bakinskii rabochii*, 7–28–56)...	2,300	400	6:1
1956	Tbilisi Institute of Railroad Engineering (*Zaria vostoka*, 9–11–56)	1,649	400	4:1
1957	Moscow State University (*Sovetskaia Rossia*, 8–1–57).....	7,500	2,000	4:1
1957	Erivan Agricultural Institute (*Kommunist* [Armenia], 8–2–57)..	1,200	270	4:1
1957	Erivan State University:			
	Biology Division.....	274	25	10:1
	History Division.....	265	25	10:1
	(*Kommunist* [Armenia], 8–2–57)			
1957	Erivan Polytechnical Institute (*Kommunist* [Armenia], 9–12–57)	1,720	320	5:1
1957	Azerbaidzhan Medical Institute (*Bakinskii rabochii*, 8–4–57)....	2,000	300	7:1
1958	Tomsk State University (*Komsomol'skaia pravda*, 8–3–58).....	4,567	737	6:1
1958	Gor'kii Polytechnical Institute (*Pravda*, 7–28–58).....	2,300	710	3:1
1958	Gor'kii State University (*Pravda*, 7–28–58).....	1,024	475	2:1
1959	Moscow State University (*Pravda*, 8–2–59).....	9,000	2,200	4:1
1959	Zaporozhie Machine building, Dnepropetrovsk Mining, Kiev Mining, Kiev Automotive, Odessa Agricultural (*Pravda Ukrainy*, 7–24–59).....	.....	.....	2 or 3: 1
1959	Odessa Construction Engineering, L'vov Polygraphic (*ibid.*)....	.....	.....	*
1959	Penza Pedagogical Institute (*Uchitel'skaia gazeta*, 8–21–59)....	320	225	1:1
1959	Michurinsk Pedagogical Institute (*ibid.*).....	52	100	0.5:1
1959	Novozybkov Pedagogical Institute (*ibid.*).....	126	225	0.6:1

* Fewer applicants than vacancies.

Sources: Given in parentheses following name of institution.

cow Aviation Institute and the Bauman Higher Technical School, have been repeatedly identified in the West as elite schools. One should not overlook the fact, however, that in the last 30 years numerous other institutions have become just as important in the Soviet educational effort as the traditionally recognized centers of learning. Institutions like the Ufa Institute of Aviation Engineering, a first-rate training center for aircraft engineers or experts on propulsion devices, or the Kiev Polytechnical Institute, with its department of automatic welding technology, are extremely important because of the highly specialized training they offer. All this underlines the profound inter-institutional differences in the quality of training available in Soviet higher education.

Inter-Institutional Differences in Admission of Students With Work Experience.—Another peculiarity in the pattern of flow of applicants in recent years is noteworthy. The proportion of entering students with two or more years of work experience has varied widely between different types of institutions. From the random compilation in table IV–13, it is evident that while the proportion of persons with work experience among all entrants has been rising in recent years and while some institutions have already reached the prescribed 80 percent limit of new students with work experience, many institutions reported a small proportion of such entrants. Many agricultural and economics institutions had the highest proportion of students with previous work experience. On the other hand, some engineering schools (polytechnical institutes) and universities, and especially pedagogical institutes, reported a substantially smaller proportion of entering students with a prior employment record. Since the Soviet authorities admit that "the general caliber of preparation is significantly lower among those entering with work experience than among students entering directly from the tenth grade," [80] the proportion of entrants with work experience may be a barometer of the caliber of the institution.

[80] *Kommunist Tadzhikistana*, Mar. 13, 1957.

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TABLE IV–13.—*Proportion of entering students with prior work experience among all students in various institutions, 1957–59*

Year	Name of Institution	Percent of students admitted with two or more years of work experience
1957	Michurin Horticultural Institute (*VVSh*, No. 9, Sept. 1959, pp. 8–14)	78
1957	Belorussian Polytechnical Institute	33
	Minsk Medical Institute	50
	Minsk State University (*Sovetskaia Belorussia*, 10–9–57)	35
1957	Kiev Institute of Light Industry (*Pravda Ukrainy*, 7–20–57)	3
1957	Moscow Academy of Architecture	60
	Moscow Institute of Finance	66
	Bauman Higher Technical School (*Sovetskaia Rossia*, 8–1–57)	25
1957	Moscow State University (*Sovetskaia Litva*, 9–3–58)	25
1957	Ukrainian higher educational establishments (all institutions) (*Pravda Ukrainy*, 10–28–58)	44.5
1957	Tashkent Textile Institute (*Pravda vostoka*, 9–8–57)	63
1957	Estonian higher educational establishments (all institutions) (*Sovetskaia Estonia*, 1–1–58)	11.4
1958	Moscow State University (*Sovetskaia Litva*, 9–3–58)	42
1958	Ukrainian higher educational establishments (all institutions) (*Pravda Ukrainy*, 10–28–58)	63.8
1958	Tartu State University (*Sovetskaia Estonia*, 12–21–58)	16.4
1958	Estonian Agricultural Academy (*ibid.*)	13.9
1958	Timiriazev Agricultural Academy (Moscow) (*Sovetskaia Litva*, 9–3–58)	80
1958	Latvian Agricultural Academy (*Sovetskaia Latvia*, 7–8–58)	19
1958	Kazakhstan higher educational establishments (all institutions) (*Partiinaia zhizn' Kazakhstana*, No. 7, July 1958, p. 27)	25
1958	Tomsk State University (*Pravda*, 8–3–58)	34
1958	Zhdanov Metallurgical Institute (*VVSh*, No. 9, Sept. 1959, pp. 8–14)	44
1958	Kaunas Polytechnical Institute (*ibid.*)	25
1958	Michurin Horticultural Institute (*ibid.*)	80
1959	Zhdanov Metallurgical Institute (*ibid.*)	70
1959	Kaunas Polytechnical Institute (*ibid.*)	40
1959	Michurin Horticultural Institute (*ibid.*)	80
1959	Moscow Engineering Economics Institute (*ibid.*)	80
1959	Tallin State University (*Sovetskaia Estonia*, 9–2–59)	21
1959	Mendeleev Chemical Technology Institute (Moscow) (*Pravda*, 8–2–59)	50
1959	Voronezh Pedagogical Institute (*Uchitel'skaia gazeta*, 7–21–59)	35
1959	Kalinin Pedagogical Institute (*ibid.*)	16
1959	Penza Pedagogical Institute (*ibid.*)	12
1959	Moscow State University (*Pravda*, 8–31–59)	60
1959	Leningrad Polytechnical Institute (*ibid.*)	58
1959	Plekhanov Institute of Trade (Moscow) (*Sovetskaia Torgovlia*, 9–9–59)	46
1959	Novocherkassk Polytechnical Institute (*Pravda*, 8–23–59)	72
1959	Kuibyshev Construction Engineering Institute (*ibid.*)	66

Sources: Given in parentheses following name of institution.

6. *The Quantitative Issue: First-Year Admissions by Type of Program and Field of Study*

First-Year Admissions by Type of Program.— From 1928 to the mid-1950's total annual admissions to Soviet higher education increased ten times. Table IV–14 breaks down the total by type of program, and shows that the sharpest rise in the total number of first-year admissions occurred between 1928 (32,800) and 1932 (245,800), a 7-fold increase in a 4-year period. The numerical growth since 1932 has been relatively slow: between 1932 and 1960 there was only a 2.4-fold increase, from 245,000 to 593,000, a gain due primarily to expanding part-time acceptances. The 1932 level of first-year regular (day) admissions was not exceeded again until the mid-1950's. In the late 1950's the total number of full-time first-year admissions was below the 1932 level; in 1960 it exceeded it, but only slightly. Only if extension-correspondence and evening program admissions are included can we speak of increases in admissions to Soviet higher education over the last three decades.

The remarkable redistribution of first-year admissions between the currently existing three types of programs (day, evening and extension-correspondence) took place particularly in the postwar period,[81] as shown in table IV–14. The percentage distributions are indicated in chart XV so as to illustrate the changing proportion of part- and full-time acceptances in selected years.

Extension-correspondence training was not recognized as higher education in the U.S.S.R. until 1938. Thereafter, however, it registered the strongest advances of all three programs. In 1932 first-year admissions were exclusively to day programs, but by 1940 only 58.8 percent of total admissions were to day programs. The proportion of students entering day programs increased during and after the war years, reaching the highest point in 1950 (65.4 percent). There was a steady decline from then on, and in 1960 the proportion was only 43 percent. The decline in the late 1950's was counter-

[81] Until 1958 Soviet authorities often included evening programs in the reporting category of "regular" higher educational establishments. For this reason "regular day and evening programs" are presented as a separate category in table IV–14 and contrasted with the truly part-time evening and extension-correspondence programs.

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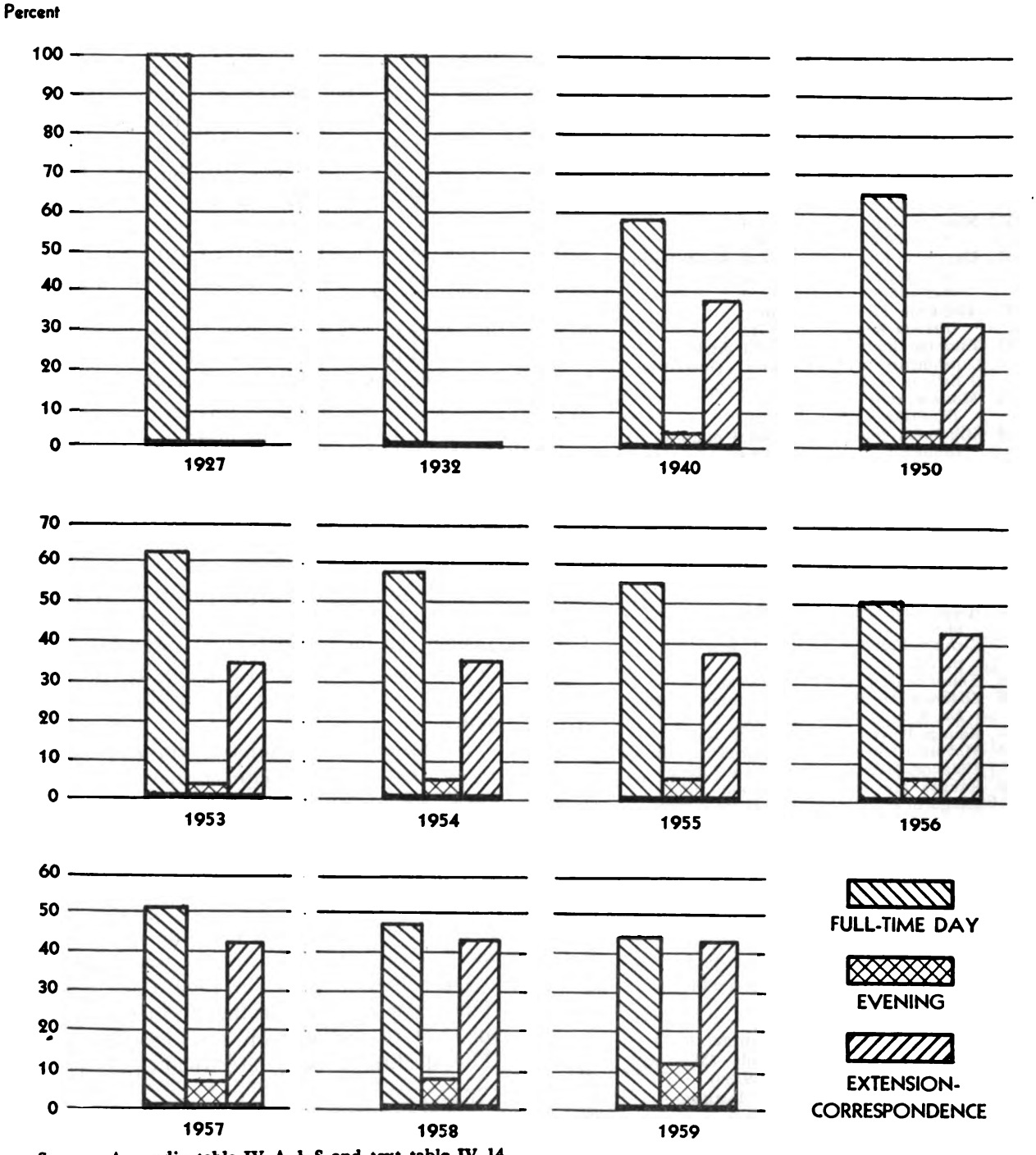
CHART XV.—DISTRIBUTION OF FIRST-YEAR ENTERING STUDENTS IN SOVIET HIGHER EDUCATION BY TYPE OF PROGRAM, SELECTED YEARS 1927–59



Sources: Appendix table IV–A–1–S and text table IV–14.

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TABLE IV–14.—*First-year acceptances in Soviet higher educational establishments by type of program, 1928–60*

Year	Grand total		Full-time day		Evening		"Regular" (day and evening)		Extension-correspondence		Actual total of part-time	
	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent
1928.....	42.8	100.0	42.8	100.0	(a)	.....	42.8	.....	(a)	.....	(a)	.....
1932.....	245.8	100.0	245.8	100.0	(a)	.....	245.8	.....	(a)	.....	(a)	.....
1940.....	263.4	100.0	154.9	58.8	6.6	2.5	161.5	61.3	101.9	38.7	108.5	41.2
1950.....	349.1	100.0	228.4	65.4	9.1	2.6	237.5	68.0	111.6	32.0	120.7	34.6
1953.....	430.8	100.0	265.1	61.5	16.6	3.8	271.7	65.3	149.1	34.7	165.7	38.5
1954.....	469.0	100.0	274.1	58.4	25.0	5.4	299.1	63.8	169.9	36.2	194.9	41.3
1955.....	461.4	100.0	257.2	55.8	28.4	6.1	285.4	61.9	175.8	38.1	204.2	44.2
1956.....	458.7	100.0	231.2	50.3	32.6	7.2	263.8	57.5	194.9	42.5	227.5	49.7
1957.....	438.3	100.0	219.7	50.1	34.7	7.9	254.4	58.0	183.9	42.0	218.6	49.9
1958.....	455.9	100.0	215.5	47.3	42.2	9.3	257.7	56.6	198.2	43.4	240.4	52.7
1959.....	511.7	100.0	227.1	44.2	63.5	(12.4)	290.6	56.6	221.1	(43.4)	284.6	55.8
1960.....	593.0	100.0	258.0	43.5	.....	.....	.....	.....	.....	.....	335.0	56.5

[a] Evening students were included in the figure for regular students. There were very few such students.

( ) Assumed by interpolation, from actual reporting of evening and extension-correspondence entrants combined.

[b] None (extension-correspondence students were not counted as bona fide higher education students).

Sources and Notes: Appendix tables IV–A–1–S and IV–A–1–A; *Eliutin-VSSS–1959*, pp. 34, 86; *NarKhoz–1959*, p. 835; *Pravda*, Aug. 31, 1959, Jan. 22, 1960, and Sept. 1, 1960; *SSSR–Tsif–1960*, p. 308.

balanced, however, by the expansion of part-time evening and extension-correspondence programs, which accounted for the remaining 57 percent of all first-year admissions in 1960.

Soviet planners are keeping a limit on full-time (day) enrollments for various reasons. Their principal motives are perhaps also the most obvious ones: part-time study allows the channeling of a large number of young people in the labor force. At the same time, it effects considerable economies in the cost of higher education: no stipends are paid to part-time students, no great expansion of physical facilities is required, and the leisure time of those fully employed in the economy is fruitfully utilized.

Further rationalization for the Soviet reluctance to expand full-time professional higher education is found in the Marxist ideological precept of "unity of theory and practice." This idea has been energetically propounded ever since 1956 when the party opened its campaign for closer ties between higher education and "production" (i.e., employment).[82] The drive culminated in Khrushchev's famed thesis and the subsequent educational reforms establishing a closer link between higher education and "life."[83]

Finally, the current restrictive Soviet policy in the field of full-time higher education may also be influenced by the fact that a numerous relatively well-trained Soviet intelligentsia is now in being and manning the Soviet industrial, administrative and political machinery. In order not to "overproduce" such specialists, the planners have decided to retrain the more "worthy" representatives already employed in technical and managerial elite positions. Thus, it may be argued, there is ample justification for the emphasis on extension-correspondence training because it is by this means that those already on the job can be upgraded or retrained, while the existing facilities take care of only a limited number of young students studying on a full-time basis in certain strategic fields. But whatever the reasons, the Soviet leadership has decided to curtail, for the time being at least, any further expansion of regular full-time higher education. This policy has brought part-time higher education to its position of prominence.

Members of an official Soviet delegation of educators visiting the United States indicated that in 1957 and 1958 admission quotas of regular universities were ordered reduced 20 percent

[82] Among literally hundreds of articles, the following examples are cited: *Kommunist* (Armenia), Apr. 18 and Aug. 15, 1956; *Sovetskaia Rossiia*, Apr. 25, 1957; *Pravda Ukrainy*, July 20, 1957; *Kazakhstanskaia pravda*, June 17, 1956; *Sovetskaia Belorussia*, June 7, 1956; *Sovetskaia Latvia*, Oct. 27, 1956.

[83] See pertinent section on higher education in appendix I–ERL.

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annually by the Ministry of Higher Education. These educators also said universities were expected to continue "trimming" regular acceptances by about 10 percent in the succeeding few years, while extension-correspondence admissions were expected to continue expanding. It is known officially that Soviet planning organs have decreed a freeze or cutback of annual acceptances by regular higher educational establishments in all European and Transcaucasian republics (Central European Russia, the Ukraine, Moldavia, Belorussia, Latvia, Lithuania, Estonia, Georgia, Armenia, and Azerbaidzhan).[84] Soviet officials explain that this was done in order to "encourage" the training of specialists in Siberian, Far Eastern and Central Asian institutions. Though partly true, this could be largely a face-saving explanation for the deliberate restriction of access to full-time higher education in large parts of the U.S.S.R. The expansion of enrollment in Soviet Asia has proceeded rather slowly, however, while the cutbacks in the European parts of the Soviet Union have been sharp. Soviet planners are definitely unwilling to expand regular higher education for some time to come. In fact, admission quotas for full-time study were scheduled to average about 225,000 annually for the duration of the current Seven-Year Plan.[85] First-year admissions to day programs increased to 258,000 in 1960, largely as a result of the accommodation of some students in the new sandwich programs (i.e., some of those accepted in "day" divisions actually took their first year as evening or extension-correspondence students). The 1960 acceptances, however, were still below the all-time high of 274,000, reached in 1954, when all daytime students entered as bona-fide full-time students.

In 1955 only 5 percent of students entering day divisions of Soviet higher educational establishments had prior work experience.[86] In 1957 it was reported that 26 percent of the students admitted to regular day programs in higher education had had two or more years of work experience.[87] The following year—in 1958— the Minister of Higher Education claimed that "70 percent of students entering higher education had work experience."[88] This figure, however, is misleading (though it has since appeared in dozens of other Soviet sources) for, as another publication[89] disclosed, this impressive proportion referred to combined admissions of 455,900 for day, evening and extension-correspondence programs. Since the regular (day) divisions admitted only 79,600 students with two or more years of work experience, only 38 percent of first-year students in regular day programs (total: 215,500) had had the desired work experience.[40]

In 1960 it was claimed again that the "goal" of 80 percent first-year students with employment experience had been "achieved."[41] However, again this proportion referred to admissions to all types of programs (593,000), and of those admitted to full-time divisions only (258,000), 57 percent had had two or more years of employment experience.

Table IV–15 provides data on the number and proportion in regular first-year admissions to Soviet higher education of persons with two or more years of prior employment, from the initiation of the preferential admission policy, in 1957, to 1960.

TABLE IV–15.—*Number and proportion of admissions to regular (day) programs of Soviet higher education of persons with prior work experience, 1957–60*

Year	Number of admissions to regular (day) programs only	Persons with two or more years of prior employment	
		Number	Percent of regular admissions
1957....	219,700	57,000	26
1958....	215,500	79,600	38
1959....	227,100	112,000	49
1960....	258,000	147,000	57

Sources: Appendix table IV–A–1–S; *Pravda*, Jan. 27, 1958; Jan. 16, 1959; Jan. 22, 1960, Dec. 23, 1960; *SSSR-Tsif–1960*, p. 308.

[84] *Uchitel'skaia gazeta*, May 16, 1958 (Eliutin's speech); *Eliutin-VSSS–1959*, p. 91.
[85] *Pravda*, Sept. 21, 1958.
[86] *Partiinaia zhizn'*, No. 4, Feb. 1959, p. 23.
[87] *Sovetskaia Estonia*, Jan. 1, 1958.
[88] *Pravda*, Dec. 24, 1958.
[89] *Eliutin-VSSS–1959*, p. 86.
[40] See appendix table IV–A–1–S. Admissions to evening divisions numbered 42,200, to extension-correspondence divisions, 198,200, for a total of 240,400. All these entrants had been and continued to be employed after entering higher education. The total number of persons admitted in 1958 with employment experience was 320,000, thus leaving 79,600 for day division entrants with two or more years of work experience.
[41] *Pravda*, Dec. 23, 1960 (Eliutin).

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Thus, since the preferential admission policy was initiated for persons with prior employment experience in 1957, the proportion of first-year entrants into the regular divisions of Soviet higher educational establishments has doubled,[42] but the planned target of admitting 80 percent of students with work experience has not so far been realized.

As a result of the reorganization of the full-time (day) programs in higher education, which stipulated that persons entering the first year of higher education without work experience must, in some specialty fields, combine full-time employment with part-time study (though these programs are still called regular-day), 70,000 first-year students were reported to have started day program studies as *full-time workers* in the fall of 1959.[43] Since the number of admissions to day divisions was 227,100, the proportion of students who entered "regular (day) programs" and yet were fully employed was about one-third of the total.

To sum up, as of 1959 the following situation prevailed in regard to first-year admissions in Soviet higher education:

511,700 was the total number of students admitted to all three types of programs—regular, evening and extension-correspondence; of which
290,600, or 55.8 percent of the total, were part-time evening or extension-correspondence students, combining study with full-time employment; and
227,100, or 44.2 percent, were regular (day) students. Of these:
112,000 were persons with two or more years of work experience, or veterans; and the remaining
115,100 were persons admitted directly from secondary schools. Of these:
70,000 were required to take full-time employment and were admitted in the revised programs of "day study" which required full-time employment during the first two years and were thus in effect evening or extension-correspondence programs. The remaining
45,000 were bona-fide full-time day students.

These figures emphasize dramatically the serious cutback in full-time education that has already resulted from the educational reforms. They are even more striking when we compare the number of those entering higher education directly from secondary school with the number of secondary school graduations in 1959. From regular 10-year schools, 1,100,000 were graduated, and from schools for working and rural youth, 300,000. Thus, only *10 percent of the 1959 graduating class was admitted directly to higher education, and only 4 percent were allowed to study on a full-time basis, at least during the first 2 years of the program.*[44] A relevant consideration is that this small minority who entered higher education upon graduation from secondary school were exempt not only from the employment requirement but, in effect, from the military draft as well. This group undoubtedly entered those strategic fields of science and engineering reserved for the most able secondary school graduates.

The preferential treatment of exceptionally able students in certain fields has revived the question of whether the Soviet regime should tolerate purely academic pursuits. Minister Eliutin has expressed his opinion clearly enough:

> The existing system of selecting the student body and the existing system of higher education do not prevent the possible emergence among certain groups of students of sentiments alien to a socialist society. Some of them imagine that they can spend the rest of their lives in mental work and in directing the physical work of others. They fancy themselves as specialists without any need to absorb the richest experience of the heroic working class and the collective peasantry. This experience cannot be found in any textbook. As the great Lenin has taught us: "It is the duty of all members of society to participate in productive labor."[45]

Soviet leaders are playing for high stakes when they expect the recent changes in admission policy and the reorganization of the program of instruction to teach the new class the virtues of productive labor above all.

First-Year Admissions by Field of Study.[46]— Table IV–16 summarizes data on the number and proportion of students entering Soviet higher educational establishments by branch of study for various years 1928–59.

[42] The percentages are even more striking when it is recalled that the proportion of such entrants in 1955 was only 5 percent. In addition, those entering evening or extension-correspondence programs are presumably all employed as well, though there have been exceptional reports in the Soviet press to the contrary.

[43] *Sovetskaia Rossiia,* Sept. 11, 1959 (editorial: "Study through Work").

[44] In relation to the age group of 18-year-olds (3,800,000), only 1.2 percent (45,000) were allowed to proceed directly from secondary school to study on a full-time basis.

[45] *Pravda,* Dec. 24, 1958.

[46] Appendix table IV–A–1–A presents data on the number of entering higher education students by branch of study for the period 1928–59.

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TABLE IV–16.—*First-year acceptances in Soviet higher educational establishments by specialty branch for selected years, 1928–59*

Specialty branch		1928		1932		1940		1945		1950		1955		1958		1959	
		Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent
Engineering, total	T	16.8	39.2	114.5	46.6	53.7	20.5	61.9	21.7	86.0	24.6	174.6	37.9	181.5	40.0	217.8	42.6
	R	16.8	.....	114.5	.....	41.1	.....	53.6	.....	70.1	.....	121.1	.....	.....	.....	.....	.....
	E	(a)	.....	(a)	.....	12.6	.....	8.3	.....	15.9	.....	53.5	.....	.....	.....	.....	.....
Industry and construction	T	.....	.....	.....	.....	45.4	17.3	52.5	18.3	74.0	21.2	144.8	31.4	152.5	33.7	185.6	36.3
	R	.....	.....	.....	.....	34.5	.....	44.8	.....	60.2	.....	100.8	.....	.....	.....	.....	.....
	E	(a)	.....	(a)	.....	10.9	.....	7.7	.....	13.8	.....	44.0	.....	.....	.....	.....	.....
Transportation and communication	T	.....	.....	.....	.....	8.3	3.2	9.4	3.4	12.0	3.4	29.8	6.5	29.0	6.3	32.2	6.3
	R	.....	.....	.....	.....	6.6	.....	8.8	.....	9.9	.....	20.3	.....	.....	.....	.....	.....
	E	(a)	.....	(a)	.....	1.7	.....	.6	.....	2.1	.....	9.5	.....	.....	.....	.....	.....
Agriculture	T	5.4	12.6	26.9	11.0	11.9	4.5	17.9	6.3	28.5	8.2	51.1	11.1	56.6	12.6	57.3	11.2
	R	5.4	.....	26.9	.....	9.2	.....	16.1	.....	23.8	.....	32.7	.....	.....	.....	.....	.....
	E	(a)	.....	(a)	.....	2.7	.....	1.8	.....	4.7	.....	18.4	.....	.....	.....	.....	.....
Socioeconomic (economics and jurisprudence)	T	5.0	11.7	22.0	8.9	13.5	5.1	20.4	7.1	25.5	7.3	28.5	6.2	38.1	8.4	40.1	7.8
	R	5.0	.....	22.0	.....	5.8	.....	9.3	.....	12.8	.....	11.6	.....	.....	.....	.....	.....
	E	(a)	.....	(a)	.....	7.7	.....	11.1	.....	12.7	.....	16.9	.....	.....	.....	.....	.....
Education, total	T	10.4	24.4	56.4	22.9	161.2	61.2	158.8	55.6	185.4	53.1	175.0	37.9	145.2	32.0	163.3	31.9
	R	10.4	.....	56.4	.....	82.2	.....	70.8	.....	108.7	.....	89.9	.....	.....	.....	.....	.....
	E	(a)	.....	(a)	.....	79.0	.....	88.0	.....	76.7	.....	85.1	.....	.....	.....	.....	.....
Education	T	.....	.....	.....	.....	159.0	60.4	155.0	54.3	182.6	52.3	172.1	37.3	141.3	31.2	159.0	31.0
	R	.....	.....	.....	.....	80.3	.....	67.0	.....	106.1	.....	87.5	.....	.....	.....	.....	.....
	E	(a)	.....	(a)	.....	78.7	.....	88.0	.....	76.5	.....	84.6	.....	.....	.....	.....	.....
Arts	T	.....	.....	.....	.....	2.2	.8	3.8	1.3	2.8	.8	2.9	.6	3.9	.8	4.3	.9
	R	.....	.....	.....	.....	1.9	.....	3.8	.....	2.6	.....	2.4	.....	.....	.....	.....	.....
	E	(a)	.....	(a)	.....	.3	.....	negl.	.....	.2	.....	.5	.....	.....	.....	.....	.....
Medicine, health and physical culture	T	5.2	12.1	26.0	10.6	23.0	8.7	26.7	9.3	23.7	6.8	32.3	6.9	31.9	7.0	33.2	6.5
	R	5.2	.....	26.0	.....	23.0	.....	26.7	.....	22.2	.....	30.3	.....	.....	.....	.....	.....
	E	(a)	.....	(a)	.....	(a)	.....	(a)	.....	1.5	.....	2.0	.....	.....	.....	.....	.....
Grand total	T	42.8	100.0	245.8	100.0	263.3	100.0	285.7	100.0	349.1	100.0	461.5	100.0	453.3	100.0	511.7	100.0
	R	42.8	.....	245.8	.....	161.3	.....	176.5	.....	237.6	.....	285.6	.....	256.1	.....	.....	.....
	E	(a)	.....	(a)	.....	102.0	.....	109.2	.....	111.5	.....	175.9	.....	197.2	.....	.....	.....

T—Total. R—Regular. E—Extension-correspondence. [a] None. Source: Appendix table IV–A–1–A.

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The 30-year trend (1928–59) in annual admissions to professional schools, by branch, may be conveniently summarized by the following rates of growth:

TABLE IV–17.—*Rates of growth in first-year acceptances to Soviet higher education, by branch, 1928–59*

Specialty branch	First-year acceptances (thousands)		Multiple of growth, 1959 to 1928
	1928	1959	
Engineering-industrial	16.8	217.8	12.9
Agricultural	5.4	57.3	10.6
Socioeconomic	5.0	40.1	8.0
Educational-cultural	10.4	163.3	15.8
Health-medical	5.2	33.2	6.4
Total	42.8	511.7	12.0

Source: Table IV–16.

These growth rates indicate that since the policy of professional manpower training was launched in earnest at the turn of the 1930's, annual admissions to all branches multiplied 12 times, with the highest rate in educational-cultural fields, followed by engineering, agriculture, socioeconomic fields, and, finally, medicine. As already stated, the most impressive gains in annual admissions were made in the early 1930's; if admissions by field in 1932 were taken as the base, the growth factors for the period 1932–59 would be cut approximately in half, and in some branches even more than that.

Chart XVI is a graphic illustration of the distribution of first-year entrants by branch in selected years, showing three basic phases in the Soviet professional training effort. During the first phase, in the early 1930's, the heaviest emphasis was upon the engineering-industrial branch. In the second phase, from the mid-1930's until the early 1950's, education fields and medicine were emphasized most heavily, as indicated by the distribution of annual acceptances. The third phase started in the early 1950's (and continues at the present time) with renewed and increasingly heavy emphasis upon training in engineering and agriculture.

This shift is fully reflected in the data on admissions for the early 1950's; in some fields—particularly in education—there was a decline and in others—especially in engineering—a significant increase took place. These admission trends were of course followed by similar shifts in graduations several years later.[47] The admissions pattern in the late 1950's makes it possible to foresee that in the early 1960's the flow of graduates in education and medicine will be even further reduced in proportion to the total and that engineering and agricultural fields will gain further ground. Thus, the present phase in Soviet professional manpower development represents an expansion of technologically oriented training of personnel for the production branches of the Soviet economy, a reversal of the trend in the intermediate phase (mid-1930's to early 1950's) which was marked by emphasis upon training education and health professionals.

The latest available information on first-year admissions by specialty branch and type of program (day, evening, extension-correspondence) is for 1955. The figures in table IV–18 on 1955 admissions reveal that extension-correspondence divisions accounted for 38.1 percent of all entering students. Extension-correspondence admissions accounted for 59 percent of entering students in the socioeconomic branch, 49 percent in education, 36 percent in agriculture, and over 30 percent in engineering fields. Approximately one-half of the total number of extension-correspondence entrants were in the education branch.

Turning now to evening programs, we find that the majority of students entering evening divisions of Soviet higher educational establishments were in engineering fields (76 percent). Evening program admissions, however, accounted for only 6.2 percent of the total admissions in 1955. In the engineering branch, however, the proportion of admissions in the evening programs (12.4 percent) was just about double the proportion for all branches combined.

Admissions to full-time study programs varied widely from branch to branch. Full-time admissions in all fields were only 55.7 percent of the total number of entering students. Admissions to full-time (day) study accounted for 93.8 per-

[47] See further discussion in section on quantitative trends—enrollments and graduations.

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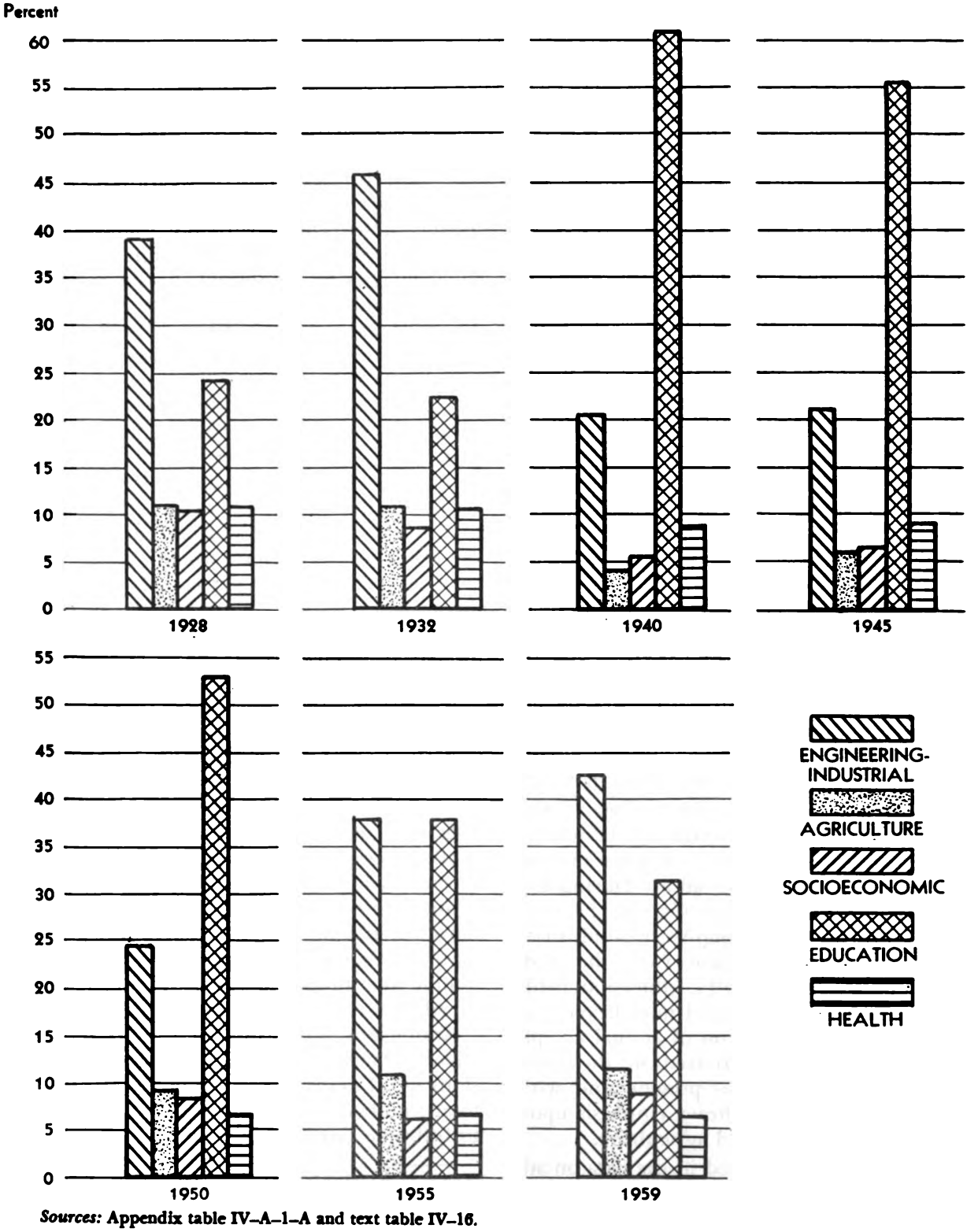
CHART XVI.—DISTRIBUTION OF FIRST-YEAR ENTERING STUDENTS BY FIELD OF STUDY, SELECTED YEARS, 1928–59



Sources: Appendix table IV–A–1–A and text table IV–16.

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TABLE IV–18.—*Distribution of acceptances in Soviet educational establishments by specialty branch and type of program, 1955*

Specialty branch		Total		Day		Evening		"Regular" total day and evening		Extension-correspondence		Actual total part-time	
		Quantity	Percent	Quantity	Percent	Quantity	Percent	Quantity	Percent	Quantity	Percent	Quantity	Percent
Engineering, total	Thousands	174.6	37.9	99.5	38.7	21.6	76.0	121.1	42.4	53.5	30.4	75.1	36.8
	Percent	(100.0)		(57.0)		(12.4)		(69.4)		(30.6)		(43.0)	
Industry and construction	Thousands	144.8	31.4	82.6	32.1	18.2	64.1	100.8	35.3	44.0	25.0	62.2	30.5
	Percent	(100.0)		(57.0)		(12.6)		(69.6)		(30.4)		(43.0)	
Transportation and communicaion	Thousands	29.8	6.5	16.9	6.6	3.4	11.9	20.3	7.1	9.5	5.4	12.9	6.3
	Percent	(100.0)		(58.6)		(11.4)		(68.2)		(31.8)		(43.2)	
Agriculture	Thousands	51.1	11.1	32.7	12.7	none		32.7	11.5	18.4	10.5	18.4	9.0
	Percent	(100.0)		(64.0)				(64.0)		(36.0)		(36.0)	
Socioeconomic	Thousands	28.5	6.2	9.5	3.7	2.1	7.5	11.6	4.1	16.9	9.6	19.0	9.3
	Percent	(100.0)		(33.2)		(7.5)		(40.7)		(59.3)		(66.8)	
Education, total	Thousands	175.0	37.9	85.2	33.1	4.7	16.5	89.9	31.4	85.0	48.4	89.7	43.9
	Percent	(100.0)		(48.7)		(2.7)		(51.4)		(48.6)		(51.3)	
Education	Thousands	172.1	37.3	82.9	32.2	4.6	16.3	87.5	30.6	84.5	48.1	89.2	43.6
	Percent	(100.0)		(48.2)		(2.7)		(50.9)		(49.1)		(51.8)	
Arts	Thousands	2.9	.6	2.3	.9	0.1	.2	2.4	.8	.5	.3	.6	.3
	Percent	(100.0)		(81.0)		(2.0)		(83.0)		(17.0)		(19.0)	
Medicine, health, and physical culture	Thousands	32.3	6.9	30.3	11.8	none		30.3	10.6	2.0	1.1	2.0	1.0
	Percent	(100.0)		(93.8)				(93.8)		(6.2)		(6.2)	
Grand total	Thousands	461.4	100.0	257.2	100.0	28.5	100.0	285.6	100.0	175.8	100.0	204.2	100.0
	Percent	(100.0)		(55.7)		(6.2)		(61.9)		(38.1)		(44.3)	

Source: Data from *KS–1956*, pp. 212–13; percentage distributions computed.

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cent in medicine and health, 81 percent in the arts, 57 percent in engineering, 48 percent in education, but only 33 percent in the socioeconomic fields.

Throughout this section frequent reference has been made to the recent drastic cutbacks in Soviet full-time higher education. However, it is important to emphasize again that while in some specialties the emphasis on applied education (to be conducted on the basis of full-time employment, part-time study) is not necessarily a detrimental development, in others it could conceivably lead to a sharp decline in the quality of training. Soviet authorities, perhaps in recognition of this possibility, have made provision for exempting students in various key fields of engineering and science from the 2-year employment prerequisite for admission, and in these fields the first 2 or 3 years of study may be undertaken on a full-time basis. This, of course, is not the case in other professional fields of education. The new emphasis on production-oriented training, associated with the reorganization of instruction programs and changes in admission policy, could create an intensified flow of technological manpower whose quality of preparation may not diminish drastically. Yet in other branches, notably agriculture, education and socioeconomic, the reforms could have a negative impact since these fields have already been damaged by extensive reliance on part-time education (in the last 10 years one-half of the students admitted to these fields were in part-time programs). The same effect could also be felt in the health-medical branch, since it has now been included in the part-time training program, and since in the new provisions, direct access to medical training has been terminated for secondary school graduates. The long-run results of this experiment combining full-time employment with part-time study will depend upon the organization of instruction in the new programs: to what extent will their pragmatic and applied orientation displace academic and theoretical learning.

Instruction Programs in Soviet Higher Educational Establishments

Soviet higher education has the unique attribute of being exclusively professional education. It offers no training programs which are not geared toward specialization. Soviet universities and institutes have no general higher education or liberal arts programs of instruction. As pointed out above, in 1959 there were 346 specialties offered in Soviet higher educational establishments, each of which had a fixed curriculum of instruction. Some specialties had further specializations within the specialty field. Every Soviet higher education graduate receives a diploma certificate stating the specialty in which he was trained and the occupational title he has thus earned, indicating the occupation in which, in theory, he should be employed.[48]

This survey can obviously not discuss the training programs for each of the 346 specialties and will limit its presentation to representative samples of higher education curricula.[49] In doing this, note will be taken of some of the recent changes in the various instruction programs.

1. *Structural Components of Higher Education Programs*

All Soviet higher education programs of instruction must be approved by the Ministry of Higher and Secondary Specialized Education. They may be prepared by the Methodological Division of the Ministry, by the individual higher educational establishments themselves, or by other agencies, such as the Main Administration of Higher Education of the Ministry of Education of the Russian SFSR (in charge of pedagogical institutes), the Ministry of Culture (in charge of art institutes), the Ministry of Public Health (in charge of medical institutes), etc. However, even though different agencies or institutions may prepare the individual programs, there is still central control over them since each and every program must be approved by the Ministry of Higher and Secondary Specialized Education.

Each higher education curriculum, or "study plan" (*uchebnyi plan*), has the following components:

1. Study schedule (*grafik uchebnogo protsessa*),

[48] "In theory," because as will be shown in ch. VI, a significant proportion of higher education graduates are not employed in fields for which they were specifically trained.

[49] Samples of the various curricula discussed may be found in appendix IV, tables IV–B–4 through IV–B–21.

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which outlines the instruction activity during each of the 52 weeks of a calendar year. It includes:

a. Instruction (*teoreticheskoe obuchenie*), usually encompassing up to 34 weeks in a calendar year. The term "instruction" covers all activities in which students engage as a group in face-to-face contact with the faculty—lectures (*lektsii*), laboratory work (*laboratornye zaniatiia*), seminars (*seminary*), group or section work (*praktikumy*); and also includes course assignments and projects (*kursovye raboty i proekty*). It does not include preparation of theses, their defense, or state examinations.

b. Examinations (*ekzamenatsionnaia sessiia*), which are conducted at the end of the spring and the winter term with their combined duration about seven weeks.

c. Study practice assignment (*uchebnaia praktika*), which embraces two to six weeks and may be conducted as a separate or simultaneous assignment while the student is engaged in other instruction activities.

d. Industrial practice (*proizvodstvennaia praktika*), or job assignment, which is a separate requirement. It consists of several assignments, with the total time involved up to 50 weeks.

e. Thesis or diploma project (*diplomnyi proekt*) and/or state examinations (*gosudarstvennye ekzameny*). In some fields both are required; in others, only one. Thirteen to 18 weeks during the final year of study are allowed for this activity.

f. Recesses or vacation periods (*kanikuly*), which are scheduled in January and in the summer.

2. Allocation of time (*svodnyi biudzhet vremeni*), which gives, by total and by year of study, the number of weeks allocated to any given activity indicated above.

3. Curriculum proper, or plan of study process (*plan uchebnogo protsessa*), which shows the total number of hours to be spent on each instruction subject by term and year, according to the method of instruction (lecture, laboratory, seminar, practice session). It also lists the terms in which students take final examinations and which type is required —graded examination (*ekzamen*) or qualifying examination (*zachet*). The former has four descriptive grades—excellent, good, average, or failing. The latter is simply either passed or failed.

4. Optional courses (*fakul'tativnye distsipliny*), which are courses students may take if they desire, *in addition* to the subjects required in the curriculum.

5. Practice assignments, which describe the type and give the dates for on-the-job assignments, consisting of industrial practice and/or teaching practice, or other practice assignment.

6. State examinations and diploma project, which states when and in which subjects examinations are scheduled and the due date and place of performance of the diploma project.

7. List of specialized courses (*perechen' spetsial'nykh distsiplin*), which lists the subjects required for a specialty or narrow specialization. Some specialized courses must be taken by all students; others are bona fide electives, called "choice courses" (*kursy po vyboru*). The student may take as many electives as are allowed by the time budget allocated in the curriculum specifically for this purpose. The hours allocated to "choice courses" must be exhausted in order to fulfill the program requirement.

8. Explanatory notes, which give various detailed instructions as to specialization options, maximum loads, additional practice assignments for specializations, when students are to be assigned to specialization groups, which courses may be added or dropped by decision of the academic council or an institution or its departments.

The Ministry of Higher and Secondary Specialized Education approves the study plans for each of the 346 specialties listed for 1959 in appendix IV–B–1. In some specialties, however, there may be two types of study plans: one "general," which is offered in any higher educational institution offering specialty training of a given type; the other "individual," which is worked out for a specific institution. A number of Soviet higher educational establishments are allowed to design their own study programs in accordance with particular training objectives (such as opening new fields, offering a unique field of study for a small number of students, or otherwise capitalizing on the strength of some department, for example one which trains researchers in a narrow branch of science). An individual program of instruction always designates the institution which offers it. This does not mean, however, that such a program may be altered at will by the respective institution without prior approval by the Ministry.

The approved curricula are accompanied by syllabi (*programmy*) for each subject of instruction. The syllabus gives detailed information on the topics of instruction in a given subject, the time schedule allocated to each, the textbooks to be used, the laboratory assignments, etc. Each syllabus is also approved by the Ministry of Higher and Secondary Specialized Education. For several specialties Western scholars have

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been able to compile the entire sets of syllabi,[50] which has enabled us to make some judgments on the comparability of professional education in the U.S.S.R. and West European and American institutions of higher learning.

2. *Instruction Programs in Soviet Universities*

In 1959 the 40 Soviet universities offered training in a total of 32 specialties,[51] embracing the humanities and the social, natural, and physical sciences.[52] If parallel specialties within the same specialty designation are counted separately,[53] then the total number of training specialties in Soviet universities would be 45. Some of these specialties have further specialization, for example physics (Specialty 2016), which has 15 specialization fields.[54]

Soviet university training today lasts from 5 to 6 years depending upon specialty.[55] In general, the curriculum in sciences is based on a total of 4,000 to 5,000 instruction hours (lectures, laboratories, and seminars) and includes 25 to 35 subjects of instruction; in the humanities and social sciences, the curricula are not so stringent and in some cases require only 3,400 instruction hours. In addition, each student is allowed 14 to 18 weeks to prepare his diploma project and/or to study for the state examinations, and between 30 and 50 weeks to complete his practice assignment. In all university programs there is a required set of subjects; in some fields, however, particularly in the humanities, additional elective courses are offered.

There are two kinds of "electives." One is called "optional courses," which a student may elect to take in addition to the fixed set of required courses. In 1959 there were, depending upon specialty, up to 15 such optional courses with total instruction time up to 800 hours. The second kind of electives falls within the student's specialty field. These are called specialty courses by choice (*spetskursy po vyboru*) and may number as high as 10. The first 2 years of university training are usually devoted to "general subjects of study" and the remaining 3 to 4 years to the major field, with narrow specialty courses taken largely in the fourth to sixth year. About 900 to 1,200 instruction hours are devoted to this narrow specialty with some courses taken "by choice" and others required. "General subjects of study" should not be misunderstood as general education subjects, for, in addition to political indoctrination courses (history of the Communist Party, dialectical and historical materialism, political economy) and physical education, which are considered "general subjects" and are universally required of all students in universities and institutes alike, other "general courses" are fundamental to the student's future specialty (i.e., higher mathematics, physics, chemistry for science students; literature, language, history and philosophy for humanities majors).

The recent changes in the curricula of university specialties consist mainly in the lengthening of the time for practice assignments. This is partly accomplished by having the students work full time on a job and study part time. Table IV–19 summarizes some university programs as they emerged *after* the curricular reforms in 1959.

[50] The Center for International Studies at M.I.T. has a fairly complete set of syllabi for physics (specialty 2016) and a partial set for mechanics (Specialty 2014). The International Relations Division of the U.S. Office of Education has a fairly complete set for history (Specialty 2008) and is in the process of compiling sets in other humanities fields. The author has complete sets of syllabi for curricula in industrial electronics (Specialty 0612) and electronic instruments (Specialty 0611).

[51] See appendix IV–B–1, specialties in 2000 series. Note that in institutional reporting, enrollment, admission and graduation statistics for Soviet universities are usually reported in the educational-cultural branch. However, in specialty group reporting, university specialties other than the 2000 series (i.e., geology, 0100; jurisprudence, 1800; economics, 1700; and occasionally medicine, 1900, and engineering 0100–1100) are reported in the appropriate branch).

[52] In the early 1950's 60-odd types of training programs could be counted. See *SPM*, p. 109.

[53] For example, see Specialty 2002 in appendix IV–B–1—training for linguists or language-literature teachers in several different languages.

[54] Supplement to appendix table IV–B–4.

[55] In 1955 the program commonly lasted 5 years, though some lasted 4½ and some 5½.

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TABLE IV–19.—*Summary of 1959 programs of instruction in Soviet universities*

Specialty	Specialty code	Length of study (years)	Total number of instruction hours (for specialization)	Total number of instruction subjects (specialization courses) [a]	Total length of practice assignments (weeks)	Term in which part-time study and full-time employment is required
I. Scientific Fields:						
Astronomy.....	2015	5½	4802 (276)	28 (12)	47	10
Physics.....	2016	5½	4781 (1076)	24 (15)	38	8, 9, 10
Chemistry.....	2018	5½	4525 (484)	20 (12)	42	8, 9
Biology.....	2019	5½	4351 (430)	32 (12)	43	9, 10
Land hydrology	1401	5½	4842 (498)	28 (6)	44	9, 10
Oceanography..	1402	5½	4783 (278)	27 (8)	55	8, 9
Geochemistry...	0106	5½	3904 (688)	27 (12)	60	None
Mathematics...	2013	5½	4482 (490)	29 (10)	39	8, 9, 10
Mechanics.....	2014	5½	4480 (862)	26 (18)	41	9, 10
II. Social Science Fields:						
History.....	2008	5	3954 (448)	27 (11)	34	1, 2, 8
Political economy (part-time).....	2010	6	2306 (136)	29 (3)	None	All
Political economy (full-time)	2010	5	3924 (422)	24 (6)	28	9
Geography.....	2025	5½	4064 (500)	33 (12)	24	9, 10
Economics (planning)	1727	5	3620 (440)	23 (5)	52	1, 2, 8, 9
Psychology.....	2012	5½	4752 (960)	25 (8)	38	9, 10
Jurisprudence...	1801	5	4138 (404)	36 (15)	34	9
III. Humanities Fields:						
Russian language and literature	2001	5	3908 (464)	26 (6)	32	1, 2, 8
National language and literature (various)	2002	5	3900 to 4100 (438)	29 to 33 (6)	32	1, 2, 8 (or 9)
Western language and literature	2004	5	4556 (564)	26 (7)	26	8
Oriental language and literature	2005	6	5672 (2800)	20 (3)	43	10, 11
Foreign language (teachers only)	2103	5	5076 (1906)	24 (6)	32	9

[a] The minimum number of specialization courses is three; the numbers in parentheses represent the maximum number of courses available from which the student may choose his specialization courses.

Source: Compiled from *Source Y, passim.*

3. *University Program in Physics*

Training offered by Soviet universities in scientific fields is commonly called experimental sciences (*eksperimental'nye nauki*), whether it is physics, chemistry, biology or other natural science field. In general, as of the mid-1950's the curriculum for science majors at Soviet universities was based on up to 5,000 instruction hours (most programs ranged between 4,400 and 4,800 hours) over a 5-year period, with required attendance in about 35 instruction subjects. There were few electives or optional courses. The subjects of instruction may be grouped into three broad categories: political and social science, general science, and special field science. The time allocation by group of subjects is presented in table IV–20. Obviously the time allocation is merely approximate. Fur-

TABLE IV–20.—*General structure of science curricula in Soviet universities as of the early 1950's*

Group of subjects	*Time allocation in percent*
Political and social science	6
General science	27
Special field science	67

Source: *Medynskii—1952*, p. 173.

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thermore, it should be borne in mind that although there were numerous "adjustments" in these training programs, the general structure had remained about the same for two decades. From 1937 to the mid-1950's there was relative stability in the general structure of the curriculum, and most of the "adjustments" concerned syllabi for individual courses.

Political and social science subjects consist primarily of indoctrination in the official version of Marxism and in current political and ideological orthodoxy. General science subjects include foreign language, general physics, analytical geometry and calculus, chemistry, theoretical and applied mechanics, etc. Usually there are 8 to 10 subjects within this group. Subjects in these two groups are ordinarily taken by students in the first 2 or 2½ academic years. Special field instruction consisting of some 12 to 18 subjects starts in most instances during the second half of the third academic year. In the last 2 years students also take narrow specialty courses, numbering from 5 to 10.

The university programs of instruction in one science field—physics (Specialty 2016)—have been examined extensively in Western sources, particularly by Korol[56] and Corson.[57] Korol examined a Soviet university 5-year physics curriculum as offered in Khar'kov State University in 1954–55, and compared it with the M.I.T. curriculum. Corson studied the 5½-year physics curriculum offered by Moscow State University in 1955–56 as a general, not individual, program, and compared it with physics courses at Columbia University. As a result of these comparisons, Korol concluded that the Soviet curriculum is "extremely comprehensive, excessively overburdened, but in terms of its science content most favorably comparable with the best American curricula for physicists."[58] Similarly, Corson found that "the hard-core courses (mathematics and physics) add up to approximately 4,000 hours during the 5-year curriculum. This is about 1½–2 times the corresponding number of hours in the typical 4-year American curriculum."[59] The Soviet "physics curriculum is extremely well structured and logical," and thus "building upon this broad foundation, Soviet students are apparently able to proceed at a quite sophisticated level and accelerated pace of instruction, leading to 'Areas of Specialization' which begin in the sixth and seventh semesters. Normally such specialization does not obtain in American universities until at least 2 years later, in what we term the 'graduate school'."[60]

There is no need to duplicate here the U.S.-U.S.S.R. comparisons in physics instruction and the detailed survey of Soviet courses made by Korol and Corson. It is important, however, to discuss another aspect—the recent changes in the Soviet physics curriculum. Appendix table IV–B–4 presents Soviet physics curricula in two versions—the 1955–56 curriculum and the new 1959–60 program. The first was compiled from the same source as in Corson's analysis,[61] and the second is based on the curriculum approved by the Soviet Ministry of Higher and Secondary Specialized Education on April 11, 1959.[62]

The 1959 program is designed for training research physicists (in 15 fields of specialization), with training lasting 5½ years, and physics teachers for secondary schools, with training lasting 5 years. The separation into two occupational profiles obtains at the end of the third year. The number of students to be assigned to each profile is determined annually by the Ministry. The difference in program content is in the area of specialization—physics teachers taking a few specialized courses and pedagogical (methodology) subjects, and research physicists taking extensive specialization courses and laboratory work.

A comparison of the total number of instruction hours, net of optional courses, practice assignments, and diploma project in three different physics curricula is as follows:

[56] Korol, *Soviet Education*, esp. pp. 256-71; see also A. Korol (ed.), *Documentary and Reference Material on Education in the Soviet Union*, Communist Bloc Program, Project Education, B/56–2, Cambridge: Center for International Studies, Massachusetts Institute of Technology, unpubl., June 1956, Part I, Series 55–26, p. 228.

[57] E. M. Corson, "An Analysis of the 5-Year Physics Program at Moscow State University," *Information on Education Around the World*, No. 11, Washington, D.C.: International Educational Relations, U.S. Office of Education, February 1959.

[58] Korol, *Soviet Education*, p. 269.

[59] Corson, *op. cit.*, p. 1.

[60] *Idem.*

[61] The author is indebted to the International Education Relations Division of the U.S. Office of Education for providing him with the original Soviet materials.

[62] *Source Y*, folio 40.

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TABLE IV–21.—*Number of instruction hours in three different physics curricula*

Curriculum	Number of instruction hours			
	Total	Lectures	Laboratory	Seminars and group study
1954–55, 5-year (Khar'kov State University)	4,290	1,898	992	1,400
1955–56, 5½-year (Moscow State University, general)	5,144	2,110	1,686	1,348
1959–60, 5½-year (general)	4,781	1,922	1,190	1,669

Source: Appendix table IV–B–4; Khar'kov University curriculum, loose-leaf folio for physics program (courtesy of N. Dodge of the University of Maryland).

It is remarkable to observe that in the three curricula the number of instruction hours devoted to lectures is about the same, but the amount of time devoted to laboratory work varies widely. It is to be noted also that the general program of Moscow State University in 1955 required more instruction hours for lectures and laboratory than the 1959 physics curriculum, a general curriculum for all Soviet universities.

The time devoted to different types of instructional activity in the 1955 and the 1959 curricula is compared in table IV–22. The major difference between the 1955 and the 1959 5½-year curricula is the reduction in the number of weeks of instruction and intensification of the industrial practice assignments from 8 to 38 weeks. In the 1959 curriculum there is also a cut of 9 weeks from vacations and a reduction of weeks allowed for examination sessions. This latter was made possible by a slight reduction in the number of examinations in the 5½-year program, as shown in table IV–23.

TABLE IV–22.—*Allocation of time in 1955 and 1959 physics curricula*

	Number of weeks		
	1955 (5½ year) (Moscow State University)	1959 (General)	
		Research physicists (5½ year)	Physics teachers (5 year)
1. Instruction	162	137 [a](38)	127 (29)
2. Examination sessions	35	30	31
3. Practice assignments	[b]8	[a]38	[a]29
4. Diploma thesis or state examinations	21	25	14
5. Vacations	55	46	50
Total	281	276	251

[a] Students take instruction on a part-time basis of up to 12 hours per week.
[b] Full-time practice assignment.
[c] Additional weeks of instruction on part-time basis.
Source: Appendix table IV–B–4 (*Source X* and *Source Y*).

TABLE IV–23.—*Examination schedule in physics curricula*

Year	Graded examinations	Qualifying examinations	Graded course assignments
1955	37	47	3
1959	29	42	1

Source: Appendix table IV–B–4 (*Source X* and *Source Y*).

In the 1959 curriculum, in order to meet the requirement for additional industrial practice in the fourth and fifth years of study, substantial changes were made in the scheduling of class work and the length of terms. This development is indicated by a comparison of the number of weeks of instruction by term, in table IV–24.

TABLE IV–24.—*Length of terms in physics curricula*

Year	Number of instruction weeks per term										
	1	2	3	4	5	6	7	8	9	10	11
1955	18	16	18	16	18	16	18	13	13	16	21
1959	18	16	18	16	18	16	25	20	18	14	13

Source: *Source X* and *Source Y*.

The change in the weekly instruction load is shown in table IV–25.

TABLE IV–25.—*Weekly load in physics curricula*

Year	Instruction hours per week per term										
	1	2	3	4	5	6	7	8	9	10	11
1955	36	36	32	32	32	32	30	31	29	28	DP
1959	32	32	32	32	32	32	32	11	12	12	[a]12

DP—Diploma project.
[a] Diploma project simultaneous with course work in specialized subjects.
Source: *Source X* and *Source Y*.

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The number of instruction hours per term has thus been altered, particularly in terms 8, 9, and 10, in order to allow students to participate in industrial work and continue part-time study at the same time. The combination of full-time employment and part-time study takes place in the 8th, 9th and 10th terms, where the weekly loads in 1959 have been cut to about one-third of the 1955 instructional load. Terms 8 and 9 have been expanded by 7 weeks. In addition, in the seventh term, the number of instruction weeks has been increased from 18 to 25, and the number of weekly instruction hours from 30 to 32. The 11th term, formerly set aside for work on the diploma project, now requires the student to take courses as well.

To sum up, in terms of individual subjects of instruction there have been only slight changes. The lecture load has remained about the same, while laboratory requirements have been reduced. Practice assignments have been made more extensive and are in effect a full-time job assignment in the fourth year. The length of terms has been increased by cutting down on vacations and examination sessions. The hours devoted to specialization have remained about the same (1955—1,049; 1959—1,076). In essence, the academic subject matter content of the physics curriculum has not been significantly affected by restructuring of the program. The instruction load in the first six terms has been reduced somewhat (from 36 hours weekly in 1955 to 32 in the 1959 curriculum), but beginning with the seventh term, which has been heavily loaded with instruction subjects, and in the 8th through 11th terms, the student must work even harder than before by combining full-time employment (40 to 42 hours per week) with part-time education (12 instruction hours per week).

4. *University Program in Chemistry*

Appendix table IV–B–5 compares the 1955 and 1959 Soviet university curricula in chemistry (Specialty 2018) and its supplement deals with time budgets, specialization courses, examinations, etc. The number of courses listed is 22, though if the specialization courses (listed as one subject) are counted individually, there could be up to 13 additional subjects. The 1959 five and one-half year program had just slightly fewer total hours than the 1955 five-year program.[63] If we compare Soviet programs in chemistry with American programs, it is immediately obvious that the Soviet university chemistry major spends at least one-third more time on chemistry subjects than is the case in the United States.[64] At most, our college chemistry majors take 10 full courses in chemistry during 4 years, with a probable maximum of 2,100 instruction hours. The range of subjects in the two curricula are about the same, but many courses which are electives in American colleges are required of the Soviet student.

The sheer size of the workload, as well as the number of examinations, exercise considerably greater pressure on the Soviet university science student than is the case of American science majors. Aside from the requirement of chemistry courses themselves, the Soviet student must learn more about other sciences, such as analytical geometry and calculus, physics, thermodynamics, mechanics, strength of materials, all of which are a part of his curriculum. Some of these subjects are undoubtedly useful for a research chemist. Our chemistry majors do not venture extensively into these subjects.

5. *University Program in Mechanics*

Appendix table IV–B–6 compares the 1955 5-year program and the 1959 5½-year program in mechanics (Specialty 2014) offered in Soviet universities. The 1959 program (4,480 hours) is substantially stronger than the 1955 program (4,126 hours), particularly in the time allocated

[63] As far as courses in basic sciences and chemistry are concerned, the 1955 curriculum was about the same as in 1944 (see *SPM*, p. 327, originally reported by Ashby, *Scientist in Russia*, p. 92).

[64] Harvard, for example, has 24 instruction weeks per academic year. (M.I.T. has 28 to 30, exclusive of reading periods.) There are usually three lectures and from 3 to 10 laboratory sessions per week in each chemistry course. If we assume an average of 6 laboratory hours as typical, the annual number of instruction hours per chemistry course would be 72 for lectures and 144 for laboratory periods. This is probably a maximum estimate, since some courses require only two lectures weekly, and laboratory work in the basic courses seldom exceeds 3 hours weekly. This optimum, with Harvard taken as the example, of about 216 instruction hours per chemistry course is assumed merely for purposes of comparison; other schools may require 250 to 280 hours.

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to mathematics courses and specialty electives. The range of courses and required time inputs in both these curricula are also stronger than in similar programs of applied and/or theoretical mechanics in most U.S. engineering schools. The Soviet programs place great emphasis on mathematics, which is also very noticeable in individual course syllabi for applied subjects. An outstanding authority in this field, Professor S. P. Timoshenko,[65] appraised a similar Soviet program as first-rate and uniquely designed for the training of "research engineers," [66] about which very little is done in the United States, except on an advanced graduate or even post-graduate level.

6. *University Program in the Humanities—Russian Language and Literature*

Soviet higher education programs in language, literature, linguistics and other areas of the humanities are, like the science programs, marked by a high degree of specialization.[67] Just as those enrolled in science programs receive no instruction in the humanities or social sciences (save for political indoctrination courses), so those specializing in the humanities in Soviet universities take no science or mathematics courses, but devote their full attention to subjects pertinent to their area as "humanities specialists."

University curricula in the humanities are usually structured around 3,500 to 4,100 instruction hours, though in some specialties (Oriental languages, West European languages and literatures) it may be in excess of 5,000 instruction hours. The general curricular structure in the humanities, in terms of distribution of time to various subject groups, may be summed up as follows:

TABLE IV–26.—*General structure of Soviet university curricula in humanities specialties as of the mid-1950's*

Subject groups	*Distribution of instruction time (percent)*
General academic subjects (foreign language, history, geography)	8–12
Specialty subjects	30–35
Narrow specialization subjects	35–40
Political (indoctrination) subjects	12–15
Pedagogical or methodology subjects	5–8

Source: *Source Y*—based on examination of 16 individual curricula.

It may be noted that in all humanities specialties, the proportion of time devoted to political indoctrination is higher (12 percent or more) than in scientific fields (8 percent or less). In addition, general academic subjects and pedagogical courses combined take up about 20 or 25 percent of total instruction time.[68] The remaining two-thirds of instruction time is allocated to the specialty area, half of it to broad subjects and half to specialized subjects of instruction.

Appendix table IV–B–7 compares two 5-year Soviet university curricula (for 1955 and 1959) in Russian language and literature (Specialty 2001). While it is difficult to compare such curricula with their American counterparts, it may be said that the Soviet curricula require about twice as many hours as American universities would require of English majors, who would probably take more varied academic courses—in fine arts, history, etc. While an examination of course syllabi and textbooks can lead us to the general conclusion that Soviet curricula in scientific and applied fields, such as engineering, medicine, and agriculture, are more or less "comparable" to American curricula in these areas, in the case of the humanities, no such conclusions can be drawn. It makes a difference, in this case, *how* some of the courses are taught: how much political bias is incorporated in a course in the history of Russian literature, for example. One American exchange student got the impression that the Soviet humanities student was well able to cite dates, recite passages from literature, and engage in formalistic structural analysis, but that in terms of interpretive understanding and ideas, with

[65] Timoshenko, *op. cit.*, pp. 32–40. Professor Timoshenko, born and educated in pre-Revolutionary Russia, has taught engineering most of his life in the United States (Stanford University) and is the author of a number of engineering textbooks.

[66] In this connection, it must be noted that the express purpose of the new Novosibirsk State University, opened in September 1959, is to train research scientists and research engineers.

[67] For a general survey, see I. Galperin, *et al.*, "The Humanities in Soviet Higher Education," *University of Toronto Quarterly*, Vol. 28 (Nov. 1, 1958), 1–96.

[68] In pedagogical institutes at least 10 percent of instruction time is devoted to pedagogy and methodology, as opposed to 5 to 8 percent in most university curricula in the humanities.

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rare exception, the Soviet student could merely rely upon dogmatic cliches.

7. *University Program in a Social Science—Political Economy*

Appendix table IV–B–8 compares Soviet 5-year university curricula in political economy (Specialty 2010) for 1955 and 1959. The programs required 30 subjects of instruction and a total of about 4,000 instruction hours, and were structured approximately as follows:

TABLE IV–27.—*General structure of Soviet university curricula in political economy*

Subject groups	*Distribution of instruction time (percent)*
Political indoctrination subjects	20
"Socialist economics" (administrative and organization courses on various branches of the economy)	30
Business administration (statistics, finance, accounting, management)	40
Other (general academic, foreign language, physical culture)	10

Source: Based on appendix table IV–B–8. The percents should be regarded as crude approximations because of the difficulty in assigning the proper proportion to the second and third groups.

It is immediately noticeable that the emphasis on political indoctrination in this specialty is high. As noted by a British economist after an extensive survey of this type of program at Moscow State University, "The main emphasis is placed on education in basic ideology," [69] with the addition of managerial skill subjects. Other Western observers have viewed this particular Soviet program as a cross between a business school and industrial engineering program, grown mostly with political fertilizer.[70] Indeed, Soviet sources themselves recognize little difference between the "political economy" taught at universities and the applied (organization-management) economics offered to engineer-economists or agronomist-economists in specialized institutes,[71] although the latter reportedly receive more thorough training.

It is extremely difficult to judge the quality of these training programs. The impressions of American exchange students of the Soviet economics student is worth noting:

> The mass of students in the Economics Faculty (in the social sciences generally) are future teachers of political economy, propagandists, and party workers. Discussions with those types are often quite a lot of fun, but too frequently degenerate into polemics. Open and critical minds are the exception here whereas they are the rule among students in the physical sciences—especially in physics and mathematics. There seems to be no doubt that these [latter] areas of study attract the most able people. It is not difficult to understand the reasons for this. . . .

8. *Other University Programs*

Soviet universities train many other types of professionals in social science fields. In the 1940's the 4-year curriculum in jurisprudence was based on about 4,100 instruction hours and the 5-year curriculum on 5,300 instruction hours.[72] The former prepared specialists in Soviet law; the latter, specialists in international law. In the 4-year curriculum, there were 33 subjects. Twelve percent of total instruction time was devoted to two purely political subjects, and 15 percent to seven academic subjects (Latin, history, logic, foreign language, etc.). The remainder of time was devoted exclusively to law subjects. An examination of a 1959 curriculum in jurisprudence [73] indicated that its basic structure had remained about the same.

The 1955 Soviet university curriculum in history (as opposed to a pedagogical institute program training history teachers) was evaluated as follows: "While one cannot pretend that no scientific, historical knowledge whatever is acquired in Soviet history courses, it is important to note that, for the most part, Marxist interpretations of history are predominant throughout the educational experience." [74]

The new 5½-year history curriculum intro-

[69] R. L. Meek, "The Teaching of Economics in the U.S.S.R. and Poland," *Soviet Studies*, vol. X, No. 4 (April 1959), 343.

[70] The author is indebted to Professors R. A. Bauer and R. N. Anthony of the Harvard Business School for their observations and the use of many valuable materials after their trips to the U.S.S.R.

[71] *VVSh*, No. 4, Apr. 1959, p. 45–51.

[72] This discussion is based on the data in Bartosek, *Vysoké*, pp. 247–78. Bartosek, a Czech lawyer, is particularly interested in this subject and his presentation contains details not found in any other source to date.

[73] Folio 55, *Source Y*.

[74] W. K. Medlin, "The Teaching of History in Soviet Schools: A Study in Methods," in Bereday and Pennar, *op. cit.*, p. 115; see also M. Levit, "Content Analysis of a Soviet History Text for University-Level Courses," *Studies in Comparative Education*, U.S. Office of Education, Dec. 1959, 19–29.

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duced in 1959 [75] increased the total number of instruction hours from 3,460 to 3,954. History students now spend the first, second and eighth terms in part-time study (16 hours per week) and concomitant full-time employment. The subjects of instruction (and their political slant, as well) remained about the same.

In sum, all fields of social science are strongly penetrated by ideological and political dictates. The pressure to conform to official orthodoxy in such programs is very extensive and undoubtedly affects the quality of training.

9. *Engineering Education—General Aspects*

Soviet higher educational establishments in the engineering-industrial branch are commonly called *VTUZ (Vysshie Tekhnicheskie Uchebnye Zavedeniia*—Higher Technical Educational Establishments) and are divided into two groups. One consists of polytechnical and industrial institutes (*politekhnicheskie i industrial'nye instituty*), and the other of industrial branch institutes (*otraslevye instituty*). Polytechnical and industrial institutes train engineers in various specialty groups, while branch institutes train them usually in just one specialty group. Within each specialty group there are a number of individual specialties.[76] Polytechnical and industrial institutes usually have six to eight divisions (*fakul'tety*), while industrial branch institutes seldom have more than three. In 1959 the total number of engineering-industrial branch institutes was 191, the majority (159) of them industrial branch institutes. Together, they offered instruction in 181 specialties, with the total number of offerings in regular (day) divisions being 1,469, so that on the average, the same offering could be given in eight different institutes.

In general, both types of institutions train engineers in a narrow specialization, and the general structure of the training programs is similar. The structure of the curriculum presented below applies to both types of *VTUZ*. Until the current revisions of instruction programs (see discussion below), the training in all engineering-industrial branch institutes lasted 5 to 5½ years. Lectures took up about 40 to 50 percent of instruction time; seminars, small group exercises and practice sessions, 20 to 25 percent; laboratory work 20 to 25 percent; and course projects 5 to 10 percent. The number of instruction hours per academic year ranged from 800 to 1,000 (or about twice the number usual in American colleges). The total curriculum was based on 4,500 to 5,300 instruction hours, with required attendance. The number of subjects was 25 to 40, depending upon specialty. Required weekly class attendance ranged from 32 to 40 hours, with the number usually higher during the first 3 years of study. Usually the student had three subjects a day for a total of six instruction hours, 6 days a week. The academic year, divided into two terms, lasted 10 months, from September 1 until July 1, but the actual number of instruction weeks seldom exceeded 32. In addition to the required instruction load, each student was required during the 5- or 5½-year course to take up to 20 weeks of industrial practice and to prepare a diploma project, for which up to 5 months were allocated.

The proportion of time allotted to various groups of subjects in the Soviet engineering curriculum for 1952 and 1957 was as follows:

TABLE IV–28.—*General structure of Soviet engineering curricula, 1952 and 1957*

Group of subjects	Time allocation in percent	
	1952	1957
General sciences	30	32–35
General engineering	35	35–40
Specialized engineering	28	20–25
Political and socioeconomic	7	8

Sources: *Medynskii–1952*, p. 174; *Medynskii–1955*, p. 163; D. N. Troitsky, *Training Technicians in the Soviet Union*, Soviet News Booklet No. 6, London, 1957, p. 21.

This excludes, however, the time allocated for two important undertakings required in all engineering programs: a thesis, or diploma project (*diplomnyi proekt*) and industrial practice (*proizvodstvennaia praktika*). Obviously, this general breakdown must be viewed as an approximation. An examination of various curricula [77] reveals, furthermore, that some 6 to 10 percent of total instruction hours are allocated

[75] Folio 30, *Source Y*.

[76] See discussion of "branch," "specialty group," and "specialty" above; see also appendices IV–B–1 and IV–B–3.

[77] Appendix IV "B" series.

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to physical training and military instruction,[78] the actual structure of the engineering curriculum would thus be as follows:

TABLE IV–29.—*Actual structure of Soviet engineering curricula as of the mid-1950's*

Group of subjects	*Time allocation in percent*
General sciences	26–30
General engineering	25–33
Specialized engineering	22–28
Political and socioeconomic	6–8
Physical training and military instruction	6–10

Source: Based on individual engineering curricula in Appendix IV "B" series, with adjustment for additional requirement of physical and military training.

In general, then, about 80 percent of total instruction time is allocated to professional education, the majority (50–60 percent) of it to general engineering and general science subjects and the remainder (20–30 percent) to specialized engineering subjects.[79] Many of the courses in specialized subjects, which are exceedingly narrow in scope, would not be found in American engineering curricula but would rather be given to new graduates by manufacturing concerns with specific employment requirements. Their inclusion in Soviet programs is a distinguishing feature of Soviet engineering education.

Within the general structure of Soviet engineering programs, there are of course individual differences and frequent changes in curricula. In the past such changes were considered a shortcoming in Soviet professional education, since they were introduced too abruptly into the program without allowing for a period of gradual transition. This was particularly true in the 1930's, when courses were suddenly excluded from the revised curriculum or new ones introduced for which the student had received no previous preparation. From the late 1930's until the late 1950's, however, there was far less reshuffling of individual subjects and the introduction or withdrawal of subjects from the curriculum was done gradually and had less disturbing effects.

Similarly, the new types of Soviet engineering programs are today being introduced gradually. The current changes, it should be noted, are concerned not so much with course contents or general requirements, but with the type of instruction, i.e., most students will enroll on a part-time basis. Specifically, the engineering specialties are to be revised so that about one-half of the curriculum is organized to suit the needs of the part-time student.[80] Most students will spend the first 2 or 3 years of the program on a full-time employment/part-time study basis (for a total of 16 months), and during the last two years on the same basis (6 months).[81] During these periods the student is expected to take extension-correspondence or evening instruction up to 16 hours per week[82] (see discussion on types of programs, above).

Another innovation is the organization of the "plant-higher technical establishment (*Zavod-VTUZ*).[83] Several such institutions are already in existence, and more are promised. These institutions may enroll engineering-technical personnel as well as qualified plant workers in an engineering training program which is conducted at the plant itself by the regular teaching staff of a nearby higher educational establishment. There may be lectures and small-group instruction for several hours, conducted partly during the working day and partly after working hours. A person participating in such a part-time program may be given up to 5 months' leave of absence (with full pay) during the year to take full-time instruction, which may be given in stretches of several weeks at a time.

[78] Nearly all the curricula examined require physical instruction and military training. Each male student who has not served in the armed forces must take about 400 hours of military instruction to qualify for the commissioned officers' examinations in the fourth or fifth year of study. According to a Soviet visitor in 1959, the "optional" physical education courses which are listed in all Soviet curricula for the third and fourth years of study are in effect military drill and instruction courses.

[79] The general structure of Soviet engineering curricula compares with the "science-oriented engineering curriculum" proposed by the Committee for the Evaluation of Engineering Education of the American Society for Engineering Education (see ASEE, *Journal of Engineering Education*, September 1955) as follows. It was recommended that U.S. engineering curricula devote 25 percent of instruction time to each of the following areas: (1) general science, (2) general engineering, (3) specialized engineering, and (4) the humanities, social sciences and physical education. U.S. engineering curricula are usually based on fewer hours, however, for a total of 2,100 to 2,600 during a 4-year program.

[80] *VVSh*, No. 1, Jan. 1959, p. 25.

[81] *Pravda*, Aug. 27, 1960.

[82] *VVSh*, No. 1, January 1959, p. 25. In 1959 full-time employment meant 46 hours per week, which is apparently to be reduced to 36 hours for students.

[83] *VVSh, No.* 2, February 1959, pp. 30–37; *Komsomol'skaia pravda*, Jan. 29, 1960, *Molodoi kommunist*, No. 8, Aug. 1958, pp. 75–76; *Sovetskaia Rossiia*, Feb. 11, 1960; *Izvestia* (Sunday supplement No. 26), Aug. 21–27, 1960.

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The program's expressed purpose is to train technology and production engineers.

Finally, programs in some engineering schools, particularly in the Ukrainian SSR, are being reorganized.[84] These programs would group all students in an engineering higher educational establishment into one "general engineering division" for the first 3 years of study, regardless of specialty, to take an identical program in general scientific and general engineering subjects. Such students will choose their specialty *not* at the time they enter the program, but after the third year of study. The instruction for the first 3 years will be conducted on a part-time basis (evening or extension-correspondence) and successful students are assigned to full-time study for the fourth and fifth years.

10. *Electrical Engineering*

Appendix table IV–B–9 compares two 1955 electrical engineering (electronics) curricula (Specialty 0611), one with 5 years of training (total instruction hours: 4,364) and the other with 5½ years (total instruction hours: 5,104). Additional information is presented in the supplement to this table. The 5½-year individual program offered at the Moscow Power Institute devotes about the same number of hours to basic science courses and to political subjects, but devotes more time to some of the narrowly specialized, advanced engineering courses. The 5-year program, on the other hand, devotes more time to general technological subjects.

While the current reorganization of the electrical engineering curriculum will not change its composition, the program will be lengthened to 6 years.[85] This particular specialty is classified as an important theoretical field, and during the first 3 years of the program, instruction in general scientific and general engineering subjects will be conducted on a full-time basis, to be followed by 1 year of a full-time employment/part-time study (16 hours per week) arrangement. The next 12 months will be devoted to full-time study of specialized engineering subjects, followed by 6 months of full-time industrial practice (with no course instruction at all). The final 6 months are allocated to specialized subjects and the preparation of the diploma project.

Another 5½-year electrical engineering curriculum (Specialty 0301—electric power stations, networks and systems), together with syllabi for its individual courses of instruction,[86] has been evaluated by two American electrical engineers, with the following conclusion:

> . . . the curriculum of Russian engineering students is considerably longer and heavier than the curriculum of American students. The former lasts 5½ years and comprises 5,100–5,200 hours of compulsory instruction with a pinpointing of specialization in the 5th year, plus an undetermined number of hours for elective courses and 19–20 weeks of industrial practice. The latter comprises 4 years, 2,800–3,000 hours, for a B.S. degree with no industrial practice, and actual specialization left to the early years on the job in industry. The Russian student receives a diploma on graduation which carries the title as engineer in his or her specialization. This corresponds to the Master of Science (M.S.) degree in the United States.[87]

11. *Mechanical Engineering*

The mechanical engineering curriculum is perhaps one of the most thoroughly analyzed programs in Soviet higher education. Appendix table IV–B–11 presents the 1946 curriculum for training mechanical engineers in the design and technology of machine tools, and compares it (supplement to table IV–B–11) with its approximate counterpart, a 1952 M.I.T. curriculum. The following observations may be made: [88]

The Soviet program was based on about 5,000 instruction hours in 41 subjects (2 of them devoted to political indoctrination, consuming 7.7 percent of total instruction time). Military and physical training consumed 10 percent of instruction time. The remaining 37 subjects were devoted to science and engineering. The entire program required about twice as many subjects and over 2,000 more hours of

[84] *Rabochaia gazeta*, Jan. 8 and Aug. 14, 1960; *Pravda Ukrainy*, July 2, 1960.
[85] *VVSh*, No. 2, February 1959, pp. 21–22.

[86] This specialty differs from that just discussed in the specialized engineering courses. The basic scientific and general engineering courses are about the same. Specialty 0301 is also offered at Moscow Power Institute.
[87] P. A. Abetti and G. F. Lincks, *Electrical Engineering Education in the U.S.S.R.*, American Institute of Electrical Engineers, CP 58–147, Feb. 1958, p. 8.
[88] Originally presented in *SPM*, pp. 120–22, in slightly different form.

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instruction than the M.I.T. program.[89] The range of general subjects in the two programs is quite comparable.

In individual subjects, the American student spent more time on general chemistry (210 hours *vs.* 138 in the Soviet program) and general physics (330 *vs.* 200), probably, in part at least, because of insufficient preparation at the high-school level.

In higher mathematics the time required was substantially greater in the Soviet program (340 hours *vs.* 180 in the U.S.). By the end of the second year, the Soviet student was expected to know analytical geometry, calculus, differential equations, elements of the theory of complex variables, and the fundamentals of vector analysis. Theoretical mechanics probably covered about the same ground for both programs, but again the time input in the Soviet program was greater (204) than in the U.S. (135). Soviet courses in theoretical and technical mechanics placed more emphasis upon graphic solutions than upon advanced mathematical statistics or operational calculus.

That group of subjects in the Soviet curriculum, commonly called specialized engineering subjects, were by and large not included in the American (i.e., M.I.T.) curriculum. Such subjects put heavy stress on technology. Some of them resembled subjects we call metal processing, mechanical behavior of metals, or metal cutting. A number of them, however, such as machine-shop layout, design and calculation of machine tools, and fire prevention and safety, were nothing more than courses on the application of technical norms, standards, and specifications used in the Soviet economy. Whatever value they had in practice, they could contribute little to the development of creative engineering talent.

Since these evaluations were originally made in 1954, numerous other Soviet curricula for training mechanical engineers have become available. Appendix table IV–B–11A presents the 1955 version of a mechanical engineering curriculum (Specialty 0511). A comparison of this more recent curriculum with the 1946 curriculum indicates that by and large only minor changes in general scientific and general engineering subjects were made. In the 1955 curriculum additional hours were devoted primarily to the basic sciences. There was, at the same time, a substantial reduction in the number of hours devoted to technological, narrowly specialized courses, an obvious result of the drive to reduce the very high degree of specialization in Soviet professional education.

Appendix table IV–B–10 presents mechanical engineering curricula for training specialists in machine building (Specialty 0521—turbine construction). Data for both the 1955 5-year general curriculum and the 5½-year individual program are given. The former trained technologists primarily, and the latter, design and development engineers.

Of the four mechanical engineering curricula discussed, the total instruction time ranged from 4,350 to 5,050 hours, half of them devoted to lectures, the rest to laboratory, seminars, practice sessions and course projects. There were at least 30 subjects of instruction. There were over 38 examinations, plus about 52 qualifying examinations and about five project assignments. The weekly instruction load varied from 27 to 36 hours per week, and the academic year lasted from 23 to 36 weeks. An additional 22 weeks were spent in industrial practice, and 16 weeks on the preparation of the diploma project.

An extensive analysis and comparison of similar mechanical engineering curricula for 1955 with the M.I.T. program have been made in another American study,[90] with the following findings—the two programs were basically alike in general scientific and general engineering subjects, but there was substantially more specialization in the Soviet case. Likewise, Timoshenko's analysis of a similar curriculum revealed that in the Soviet mechanical engineering curriculum: "[The] training in general sciences and engineering . . . is wider in scope than that presently given by American schools in their undergraduate programs."[91] These findings indicate that the specialization in the Soviet curriculum is achieved not in place of, but rather in addition to, basic engineering

[89] M.I.T.'s program was based on an average of 30 instruction weeks per academic year. Required class attendance ranged from 2,800 to about 3,000 hours. The total number of subjects (arranged to conform to Soviet categories) was about 20.

[90] Korol, *Soviet Education*, pp. 235–56.

[91] Timoshenko, *op. cit.*, p. 26.

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training. A team of British atomic scientists who visited the Soviet Union in 1955 had the following comments on the mechanical engineering curriculum:[92]

. . . the degree of specialisation required of a Russian mechanical engineer at graduation is much greater than would be regarded as proper at any British university. It should, however, be noted, that this specialisation is achieved by a longer period of study and does not imply that insufficient time is spent on the teaching of fundamentals. The common courses taken by all students occupy some two-thirds of the total teaching time, and the time spent on basic subjects is as great as in British university courses.

A British engineering team examined the mechanical engineering curriculum in another specialty (Specialty 0528—hydraulic turbines and machines) and reached the following conclusions:[93]

. . . the broad issue of "which, between the British engineering first-degree man and the Russian engineering diploma man, has the higher standard of attainment at graduation" is far more clear; and our view, based on a combination of first-hand impressions and fact, must be that the Russian at present stands the higher on average. That he is a fairly narrow specialist by the time he graduates is beyond dispute, but his apparently adequate level of attainment at entry to his institute, coupled with the subsequent broad foundation course of two to three years, must surely mean that he can turn his hand, when in practice, to problems other than that of his specialty. . . .

. . . it may well be considered more realistic to compare the Russian diploma man with the British graduate who has completed such additional industrial training: on this basis the situation is without doubt reversed, the Briton taking prior place. But this is not to gloss over the graduates who immediately take up jobs; for they may be compared as they stand with the newly qualified Russian diploma man. . . .

Finally, an American engineering exchange mission reported after its visit to the Soviet Union in 1958:[94]

Receipt of a diploma in engineering in the U.S.S.R. corresponds roughly in academic content to the awarding of a bachelor's degree in the USA. In certain respects this diploma approaches the level of the master's degree in the USA. The U.S.S.R. curricula contain much industrial training which is required for the graduate to immediately function as a professional engineer, and which in the USA is expected to be obtained during his first few years of employment.

12. *Chemical Engineering*

Appendix table IV–B–12 presents a 1938 Soviet chemical engineering curriculum for training specialists in silicate technology; the supplement to this table reconstructs the M.I.T. curriculum in the same specialty.[95] The Soviet program was based on about 4,700 instruction hours and included 30 subjects, 25 of which were sciences and engineering technology and the remaining 5 were courses in political ideology, military and physical training.

The general scientific and general engineering subjects were about the same for the Soviet and American curricula, but again the time input required was substantially higher in the Soviet case,[96] while the required hours for physics and general chemistry were less. The Soviet program devoted more hours to higher mathematics, general engineering subjects, and to advanced chemistry courses (except physical chemistry). The M.I.T. program allocated more hours to general chemical engineering and to general industrial chemistry than the Soviet program, but did not offer any of the chemical technology courses with narrow specialization in silicate technology which the Soviet program offered.

The degree of technological specialization in the Soviet case, as expected, was the main difference between the two programs. In addition, foreign language was stressed more heavily in the Soviet program and was considered a "science" subject because it concentrated on reading and translation of foreign scientific-technical literature.

Appendix table IV–B–12A presents a 1955 Soviet chemical engineering program for specialists in the technology of silicates (Specialty 0806). In comparison to the prewar curriculum

[92] B. L. Goodlet, "How Mechanical Engineers Are Educated in Russia," *Engineering* (London), Feb. 10, 1956, 134. The comments refer to the curriculum reproduced in appendix table IV–B–10.

[93] *Engineering Education in the Soviet Union*, London: Unwin Brothers, Ltd., 1957, pp. 17, 18.

[94] *ASEE*, p. 842.

[95] This comparison was also made in *SPM*, pp. 122–23, 319–20.

[96] The M.I.T. curriculum required 3,135 hours and included about 360 hours for the humanities and social sciences and about 240 hours for military science and athletics. Also the program lasted four years as opposed to the 5-year Soviet program.

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just discussed, the number of hours devoted to science and general engineering subjects was increased. There was a slight reduction in the number of hours devoted to some of the specialized courses.

Table IV–30 compares the number and proportion of hours devoted to groups of subjects in a Soviet and American chemical engineering curriculum as of 1955. This comparison led Dr. J. G. Tolpin of the Standard Oil Co. to the following conclusions: [97]

Concerning the curriculum, a student in a technical college takes a prescribed set of courses in which he has no option and has to pass a series of examinations. A student can pass to a higher class only once a year and on the basis of these examinations. The programs of study comprise practically the same basic subjects as given in the engineering schools of other countries. . . .

. . . The program of study in chemical engineering includes not only general chemical technology, processes and equipment for chemical industries, and corrosion of metals, but also automation of chemical plants and safety techniques.

TABLE IV–30.—*Comparison of plan of study in institutes of chemical technology, U.S.S.R. vs. United States*

	Soviet chemical technological institute, 1955		Massachusetts Institute of Technology, 1955	
	Hours	Percent	Hours	Percent
Socioeconomic studies and humanities	624	12.0	432	12.3
Physical-mathematical sciences	660	14.9	572	16.3
Chemical sciences	1,110	25.0	1,080	30.7
Chemical engineering	452	10.1	588	16.7
Mechanical engineering	844	19.0	288	8.2
Special subjects	600	13.6	552	15.7
Total	*4,426	100.0	3,512	100.0

* Includes 136 hours of physical education and sports.
Source: J. G. Tolpin, "Chemical Engineering in the U.S.S.R.," *Chemical Engineering Progress*, vol. 54, No. 8 (August 1958), p. 74.

In addition to formal courses, a Soviet student of engineering acquires up to six months plant experience in the course of his study. . . .

. . . Narrow training of specialists was needed to produce engineers ready to step into production the moment they were graduated and drive for increased volume of production as dictated by overall plans of industrialization. As that objective was partially achieved, the number of specialties into which the engineering industry was divided was greatly reduced with a proportionate increase in emphasis on basic sciences. . . .

13. *Civil Engineering*

Supplement 2 to appendix table IV–B–13 discusses the courses offered in the Soviet civil engineering program of the late 1930's training specialists for hydrotechnical structures. Appendix table IV–B–13 compares two 1955 curricula in the same specialty (Specialty 1203—hydrotechnical structures and power stations), one a general curriculum and the other the individual curriculum used in the Moscow Construction Institute. Although we do not have data on the allocation of hours for the late 1930's curriculum, great similarity in the types of courses offered may be noted for the earlier and the 1955 curricula.

The two 1955 curricula—general and individual—have the same subjects and hours devoted to basic scientific and engineering courses. In the general curriculum (version a) more specific specialty engineering courses of a technological nature are required, while in the individual curriculum, for the Moscow Construction Institute, there are three specialization options aimed at training design engineers of a specific profile.

14. *Technology and Development Profiles in Engineering Programs*

In the Soviet programs discussed above for electrical, mechanical, chemical and civil engineers, we noted that there were some differences in

[97] J. G. Tolpin, "Chemical Engineering in the U.S.S.R.," *Chemical Engineering Progress*, vol. 54, No. 8 (August 1958), 72.

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general versus individual curricula for the same specialty. They were similar in two areas of instruction: general sciences and general engineering subjects. The differences between general and individual programs of instruction occurred in the area of specialized subjects; i.e., general programs usually have more specialized engineering subjects of a technological nature, while individual programs have more advanced and often more specialized courses in a very narrow field. In the latter case, such courses are aimed not so much at providing a technological orientation as training engineers with a high proficiency in design and development work in one particular area of engineering. As noted by the Engineering Education Exchange Mission to the U.S.S.R.:[98]

> While the general pattern of the basic science course is the same for all Soviet engineering schools, the amount of time and attention given to any specific subject varies with the specialty and the school. . . .
>
> More significant changes are introduced, generally as overload electives at first, by a few leading institutions. Eventually, hand-tailored, individual curricula including such new material may be authorized at these institutions by the Ministry. For instance, the Bauman Institute curriculum for turbine design is different from the general curriculum in the same specialty; the Moscow Power Institute has recently introduced a course in atomic power stations which is not taught anywhere else. . . .

Some individual programs are thus aimed at opening up new fields of engineering specialization. Their graduates have specialized in design and development activities rather than technology-production activities in fields already well established. Such programs are not limited to new fields only, however, and some exist in traditional engineering specialties for the express purpose of training design and development engineers. This is not a new development in Soviet engineering education, and for many years the problem of technology-production engineers versus product or process design and development engineers has been an issue.

Since the late 1930's, when most of the Soviet engineering programs were stabilized, the educational authorities have aimed at two profiles of training in any field of narrow engineering specialization—one, a program for training technology-production engineers, the other for training product or process design and development engineers. The need for slightly different curricula in certain narrow fields has been advocated for the last 20 years. In the 1930's some institutes gave more extensive theoretical training than others.[99] The instruction programs in some engineering schools related to defense industries or strategic fields of engineering development offered more extensive training in mathematics, physics, theoretical and technical mechanics, and foreign language than other engineering schools, a trend which has continued to the present day. In the 1940's and 1950's some engineering institutes reportedly had vastly superior experimental and laboratory facilities, and were thus able to offer more extensive training in experimental theory and its applications than others.[1] In effect, such institutions were responsible for training a large share of the design and development engineers. This practice was criticized, however, and it was argued that individual engineering schools should not assume the overall responsibility for training such engineers; rather, all engineering schools should train production engineers (*inzhener-proizvodstvennik*) and design engineers (*inzhener-konstruktor*) selected from among them.[2] Proposals in 1958 and 1959 renewed the arguments.[3] Recent discussions have centered again on two profiles for engineering training. It was suggested that the scheduling of the instruction program be based on different part-time/full-time schedules for technology-production versus design-development engineers. Design engineers should study full-time for 3 years so as to thoroughly master science and engineering subjects. Then, after 1 year of on-the-job practice, they should complete their design training in a research institute or design bureaus. Technology-production engineers, on the other hand, should study on a part-time basis for the first 2 or 3 years and then begin full-time study, after which more industrial practice assignments of 6 months to a year would complete their training.

[98] *ASEE*, pp. 858, 863.

[99] E.g., see *Pravda*, July 12, 1940.

[1] Various reports in *VVSh* during the 1940's and 1950's.

[2] *VVSh*, No. 9, September 1954, p. 7.

[3] See, esp., I. I. Artobolevskii, "O podgotovke mashinostroitelei" (Concerning the Training of Engineers for Machine Building), *VVSh*, No. 1, January 1959, pp. 20–22. There are a number of other articles on this same subject in various issues of *VVSh* during 1958 and 1959.

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In general, too much stress on the technological training of Soviet engineers can be viewed as a hindrance to the development of creative engineering talent. But it must not be forgotten that such specialized training was well suited to Soviet conditions, where technological expansion in various industries has been not so dependent upon original discoveries as on the application of technology discovered and often tested elsewhere. While one cannot deny that in some fields of industrial technology and applied science, the Soviet Union has done some original and outstanding research, nevertheless Soviet industry has been built up not on original technological discoveries, but on adaptations of techniques developed elsewhere, in economies with more advanced technology.[4] Soviet engineering training suited these conditions. Yet, particularly at the present stage of development in the U.S.S.R., some educational authorities recognize that more creative engineering talent should be specifically developed, and that many of the routine technological specialization courses offered by Soviet engineering schools are not necessarily an asset to such development. The problem becomes more acute with the current emphasis on more industrial practice, full-time employment and practical experience, which intensifies the technology-production orientation. The desire of Soviet engineering educators to exempt some strategic fields of engineering from the excesses of such emphasis is clearly evident, and is reflected in the individual curricula, which, within a given specialty, allow certain select institutions to offer different profiles of engineering training.

15. *Operations and Maintenance Engineering and Other Programs*

Appendix table IV–B–14 presents a 1955 Soviet engineering curriculum for training engineers in automotive transport, operations and maintenance (Specialty 1609). This program, in comparison with those discussed above, seems to be considerably inferior. The number of instruction hours devoted to several general scientific and general engineering courses was smaller than in the other programs, while more emphasis was placed on routine technical courses of specialization.

In addition to automotive engineers, the Soviet Union also trains other maintenance and operations specialists,[5] for example mechanical engineers on the maintenance of railroad equipment.[6] In 1957, of the 94,000 specialists trained in maintenance and operations engineering, 46,000 of them were employed by Soviet railroads. Although the training program also lasts 5 years and the total number of instruction hours is comparable to other engineering programs, it is intended primarily to prepare individuals to organize and supervise repair work on rolling equipment and to handle various maintenance problems.[7] The first 3 years of the program are devoted to general engineering training, and the last 2 years almost entirely to courses on technical norms, standardization of replacement parts, inspection, test practices, etc. These practical areas are more strongly pronounced than in other programs. Other types of operations engineers trained in this category are railroad station masters, dispatchers, track maintenance men, etc. Although some transportation engineering institutes have strong civil engineering departments[8] for training tunnel and bridge design engineers and their graduates may be noted for excellence, the engineering training in Soviet transportation institutes would seem largely to be of inferior quality compared to other engineering institutes.

A similar type of "engineering" education is river boat maintenance and operations, maritime navigation and ship maintenance. There are four higher maritime schools—two in Odessa (one of which is engineering), one in Leningrad (engineering) and one in Vladivostok—

[4] This, of course, is one of the major reasons for the greater stress on foreign languages in Soviet professional training and the Soviet translating activity of world scientific and technical literature, unmatched by any other country.

[5] Curricula for Specialties 1601 (rolling stock and locomotive park of railroad transport) through 1610 (operations and exploitation of aircrafts and engines) may be found in *Source Z*, pp. 355–74.

[6] V. Sologubov, "Kadry zheleznodorozhnogo transporta" (Cadres of Railroad Transport), in B. Levin (ed.), *Osnovnye voprosy piatiletnogo plana vosstanovleniia i razvitiia zheleznodorozhnogo transporta SSSR* (Problems of Reconstruction and Development of Railroad Transport in the U.S.S.R.), Moscow, 1947, pp. 363–81. See also *Gudok*, Aug. 18, 1948, June 8, 1949; V. M. Efimenko, "Kadry sovetskogo zheleznodorozhnogo transporta i sistema ikh podgotovki" (Cadres of Soviet Railroad Transport and System of Their Training), *Zheleznodorozhnyi transport*, No. 11, 1957, pp. 73–78.

[7] See *Zheleznodorozhnyi transport*, No. 1, 1957, p. 58.

[8] Timoshenko, *op. cit.*, pp. 26–32.

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which train not only engineers, but ships mechanics, navigators, radio communication operators, merchant marine officers, harbor masters, oceanographers, and other specialists.[9] The training in these schools lasts 5½ to 6 years and is officially considered "comparable" to other engineering programs,[10] although it is doubtful if the divisions which do not train bona fide naval engineers are of comparable quality.

Another undoubtedly inferior type of "engineering" training in the Soviet Union is that for mechanical engineers for the maintenance and repair of agricultural machinery [11] and the electrification of agriculture. A description of these programs [12] indicates that they use a purely descriptive and applied approach. Up to 10 percent of the instruction time is used for courses on the organization of agriculture, and another 25 percent for purely pedestrian maintenance and technology courses (the selection of fuels and lubricants, the maintenance of tractors, trucks and agricultural machinery, the scheduling of tractor park operation, etc.).

In general, then, the "engineering" programs discussed in this section are inferior not only to those in most other countries but also to the majority of genuine engineering programs in the Soviet Union itself.

16. *Engineering Economics and Management*

Many Soviet engineering schools and several economics institutes offer programs in "engineering economics." A comparison of the 1955 and 1959 programs in one specialty in this group (Specialty 1709—organization and management of the machine tool industry) is presented in appendix table IV–B–15. The 1955 5-year curriculum is summarized in table IV–31.

TABLE IV–31.—*Structure of the 1955 five-year curriculum in engineering economics offered at the Moscow Institute of Engineering Economics (machine tool industry, specialty 1709)*

Course groups	Hours	Percent
Political (Marxism-Leninism, political economy, economic geography)	700	17
Science and engineering (mathematics, physics and chemistry, drafting, engineering)	1,630	40
Business administration (production, management, statistics, accounting, business law, finance)	1,430	36
Foreign language	140	3
Physical education	140	3
Total	4,040	100

Source: Appendix table IV–B–15.

As may be noted, three-quarters of the instruction hours were devoted to specialized subjects, half of these to science and engineering and the other half to business administration.

The 1959 curriculum for the same specialty was extended to 5½ years, with a 5 percent increase in the total number of instruction hours. In the postreform curriculum, the student will study on a part-time basis (16 hours per week) during the first 2 years, while being employed full time.[13] The number of subjects remained about the same, with just slight reductions of time allocated to some courses, and an increase in the time devoted to most basic scientific and engineering subjects.

Soviet "engineer-economists" used to be trained both in engineering schools as well as in separate institutes; but recent discussions indicate that such specialists should be trained primarily in engineering institutes from now on,[14] and the separate institutes for economics are to be merged with the engineering schools.

Related to the training of "engineer-economists" is that for various "trade specialists." [15] For these specialists the science and engineering

[9] See A. V. Borisov, *Uchebnye zavedeniia Ministerstva Moskogo Flota SSSR* (Educational Establishments of the Ministry of Maritime Transport of the U.S.S.R.), Moscow, 1957, esp. pp. 44–68.

[10] The 1957 enrollments in these higher educational establishments were as follows: Odessa Naval Engineering (*OIIMF*)—3,500; Leningrad Naval Engineering (*LVIMU*)—3,700; Vladivostok Maritime (*VVMU*)—1,500; Odessa Maritime (*OVMU*)—2,400. (*Idem.*)

[11] Actual 1955 curricula can now be substituted for that reported in *SPM*, pp. 123, 321–22, which was from a refugee source. *Source Z*, pp. 345–48, presents curricula in the above specialties (1508 and 1509), and they appear to be substantially inferior to other engineering programs.

[12] K. A. Ivanovich, *Sel'skokhoziaistvennoe obrazovanie v SSSR* (Agricultural Education in the U.S.S.R.), Moscow, 1958, pp. 80–82.

[13] See supplement to appendix table IV–B–15.

[14] *Promyshlenno-ekonomicheskaia gazeta*, July 1, 1959; *VVSh*, No. 1, January 1959, p. 32. Agricultural economists are supposed to be trained in agricultural institutes.

[15] E.g., those trained for work in trade and distribution in various sectors of the economy. See V. V. Kozlov (comp.), *Moskovskii Institut Narodnogo Khoziaistva imeni G. V. Plekhanova: 50 let instituta* (Moscow Institute of National Economy of G. V. Plekhanov: 50th Anniversary), Moscow, 1957.

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courses are reduced, and more courses in finance, trade organization and procurement included.

17. *Industrial Practice in Soviet Engineering Programs*

The stress upon production and technology in Soviet engineering training is carried beyond mere classroom instruction. In American engineering schools, more as an exception than a rule, there may be cooperative training programs, where several terms are devoted to on-the-job assignments. In the Soviet Union, however, industrial practice is required in all engineering programs (and practice assignments are required in other fields of professional training).

For the two decades prior to the reorganization of instruction programs in 1959, students had usually three industrial practice assignments over the 5-year engineering program in industrial plants or enterprises allied with their field. The first assignment, usually in the summer following the second year of study, lasted about 4 weeks and was called general industrial practice (*obshcheindustrial'naia praktika*). The student was familiarized with the plant and assigned for a few days at a time to various shops. The second assignment, called general technological practice (*obshchetekhnologicheskaia praktika*) was of about 11 weeks' duration during the summer following the third year. During this period the student was required to study one industrial process in a plant with detailed attention to the various machinery, norms, and technology employed. Finally, the third industrial assignment, called prediploma practice (*preddiplomnaia praktika*), was also of about 11 weeks' duration and was scheduled either in the summer following the fourth year or in the fall during the fifth year. It consisted of an administrative assignment, assistant shop superintendent for example, or other similar position involving decision-making of a minor supervisory nature.

While these were the most common arrangements for industrial practice, they could vary from field to field. In aviation engineering, for example, there were four practice periods, one of them devoted to the piloting and maintenance of aircraft. The total time devoted to industrial practice over the 5-year program ranged between 16 and 38 weeks, with 25 weeks being the most common.

The 1959 reorganization of Soviet higher education instruction programs involved both extension and consolidation of industrial practice.[16] There are at least two practice assignments, one called "technological assignment" and the other "prediploma assignment."[17] The technological assignment (which is some programs may be divided into two separate assignments) lasts not less than 1 year following the third or fourth year of study; the prediploma assignment lasts from 2 to 5 months during the fifth year. For example, in the electrical power engineering program, there would be (in addition to the full-time employment/part-time study requirement) 5 months of technological practice in the third year and 7 months in the fourth year, plus 2 months of prediploma practice in the fifth year.[18]

Over the years there has been criticism of industrial practice, not in principle but in terms of its execution.[19] As noted recently by the U.S. Engineering Education Exchange Mission to the Soviet Union: "There is considerable reason to agree that most of the industrial practice as carried on at present [i.e., 1958] serves little useful purpose."[20] Even after the reorganization in 1959, complaints were voiced in the Soviet press that students did not participate actively but were merely passive observers of the operation of machinery, technological processes and techniques.[21] In another recent account a plant official was asked how the industrial practice students were doing. "You mean the tourists?" he shrugged. "They should be around here somewhere."[22] The "tourists" may be more than a turn of phrase. During the months allocated to industrial practice, there

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[16] Not to be confused with the full-time job assignment during the first 2 years for most students entering some engineering schools without work experience. See *VVSh*, No. 11, November 1960, p. 3.

[17] *VVSh*, No. 5, May 1959, p. 30.

[18] *Ibid.*, p. 31.

[19] E.g., *ibid.*, No. 3, 1955, pp. 26–30.

[20] *ASEE*, p. 876.

[21] Of the 2,000 metallurgical engineering students who came to the Kuznetsk Metallurgical Plant for industrial practice, only a "few dozen" reportedly worked and the rest "looked on" (*VVSh*, No. 10, October 1960, p. 22).

[22] *Komsomol'skaia pravda*, Aug. 5, 1959. This issue has four other stories on the inefficiencies of industrial practice.

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are large numbers of students to be placed.[23] In addition, there is a reluctance on the part of industrial management to have the inexperienced students participate actively in the production processes because of minor annoyances like breakage or more serious ones like the diversion of qualified personnel from their production tasks. Prediploma practice is equally assailed as "toy research." [24]

From these accounts, it would appear that industrial practice in Soviet engineering programs may be merely a superficial introduction to the production process rather than a thorough study of production techniques. Now, as in the past, however, new engineering graduates take additional on-the-job training, called qualification apprenticeship, to allow them to become familiar with particular techniques and job functions prior to their assignment to supervisory positions.[25] The apprenticeship for most new engineering graduates begins with an assignment as assistant foreman in industrial shops.

18. *Engineering Thesis—The Diploma Project*

Engineering training, as many other fields of professional higher education in the Soviet Union, culminates in the diploma project. Until the recent revisions of instruction programs, the student was not required to take any courses during the last term, but devoted the entire 4 to 6 months to this project. The Soviet diploma project differs from the theses or reports sometimes required of American students about to graduate (especially of honor students). It is, for one thing, much more extensive and, in addition, is primarily an engineering design or technological undertaking.[26] If a design undertaking, it is probably meticulously and technically detailed rather than original, although some diploma projects may be so executed that they can be adapted by industry as genuine innovations. However, in most cases, the diploma project serves to test the student's ability to perform engineering calculations, execute charts and technical drawings, and apply existing norms and specifications, which, generally speaking, are already in use.

Ideally, the material in the diploma project should be apportioned as follows: [27]

	For theses with a technological profile	*For theses with a design-development profile*
	Percent	*Percent*
Materials devoted to engineering principles and calculations (including drawings)	20	70
Materials devoted to technological and production aspects (including charts)	65	25
Materials devoted to economics, cost calculations and organization of production	15	5

The theses should be from 100 to 200 pages long, and theoretically should have a creative and critical approach to a specific engineering problem. Complaints have been widespread, however, that they are "artificially contrived" and unreal and that even though 80 percent of them are rated "good" or "excellent" most such grades are "unwarranted." [28] More specifically, the students:

> . . . simply copy all the well-known engineering facts from books, match them with the standards of the *GOST* [Basic National Standard Codes], repeat typical calculations several times, and . . . do not pay much attention to . . . comparative estimates or evaluations. As a rule, the thesis notes do not even draw any conclusions . . . nor try to evaluate the engineering or economic effectiveness of the project.[29]

Whatever the value of the diploma project, however, after it has been completed, it must be defended before a specially appointed board, which not only determines if it is acceptable but also judges its "practical value," i.e., if it can be applied in industry. During the defense, the student is also tested orally on his knowledge of special subjects. The combination of his past grades, the diploma project and its defense, and the oral examinations determine the

[23] An official of a large metallurgical plant said: "We have 1,500 students assigned for industrial practice. Where can we find that many staff positions? So some of them crowd around the steel smelters or rolling stands and look at the work done by the steel workers. Others go down by the river and sit in the shade" (*Komsomol'skaia pravda*, Aug. 5, 1959). See also *Bakinskii rabochii*, Jan. 13, 1957; *Zaria vostoka*, Nov. 20, 1958; *Kommunist* (Armenia), Oct. 4, 1956, Jan. 24, 1957; *Sovetskaia Kirgiziia*, Aug. 12, 1959.

[24] *Komsomol'skaia pravda*, Apr. 21, 1957; *Promyshlenno-ekonomicheskaia gazeta*, Aug. 12, 1959.

[25] Many plants in recent years reportedly would not appoint persons to supervisory engineering positions until they had up to 2 years of job apprenticeship (*stazhirovka*) (*VVSh*, No. 3, March 1959, p. 7).

[26] See appendix IV–B–16: "Diploma Project Requirements in a Soviet Engineering Institute."

[27] *VVSh*, No. 4, April 1959, p. 18.

[28] *Ibid.*, No. 7, July 1959, pp. 71–78.

[29] *Ibid.*, No. 4, April 1959, pp. 15–16.

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award of the diploma certificate, with or without distinction, which states that he is a trained engineer in a given specialty.

19. *Medicine*

Eighty higher educational establishments offer 6-year professional education in medicine in the U.S.S.R.[30] The diploma received at the completion of training certifies the graduate as a "physician" (*vrach*), the majority with the occupational specialty "general practitioner," "pediatrician" or "surgeon." [31] Since World War II there has been much discussion of Soviet medical education in American publications.[32] Appendix table IV–B–19 compares Soviet medical curricula for 1945 and 1955. Supplements 1 and 2 to this table compare the number of instruction hours allocated to various medical subjects in Soviet and several U.S. medical schools. It appears that the Soviet curriculum has less extensive coverage in those areas which coincide with our premedical training (i.e., chemistry, biology, biochemistry), especially when one realizes that additional science subjects are often taken as part of the undergraduate premedical education. In addition, the U.S. program in clinical subjects is undoubtedly more extensive since the Soviet program requires no internship but only 16 weeks of practice taken during the 6-year program. Soviet authorities have recognized this shortcoming: "One of the main deficiencies is insufficient practical preparation. . . . This . . . can be achieved only if the medical schools have adequate facilities . . . in clinics, laboratories, and other study facilities. Lack of these handicaps independent work and makes [the students] mere observers." [33]

Soviet medical institutes are set up as separate professional schools and therefore are not connected, as many American medical schools are, with universities. A recent criticism was that because of this, only the specialized subjects received the proper attention and there was a lack of basic preparation in the general subjects of physics, biology, and chemistry, a situation which led to particularly damaging results in medical research.[34] The 1959 reorganization of medical education envisaged the strengthening of both basic premedical courses and practical training and the curtailment of such extensive specialization.[35] This latter goal may be difficult to attain, for at the same time the gainful employment practice required after the 6th, 8th and 10th terms seems to be of a decidedly applied and specialized nature.

The range of specialized subjects offered in medical programs is about the same in the U.S.S.R. and the United States (there is also a remarkable similarity in the number of instruction hours); but, because of the degree of specialization and the official policy to train Soviet physicians for practical employment immediately upon graduation, the Soviet program has "compromised the high standards of intellectual freedom and motivation which have characterized the training of physicians in the Western world." [36] On numerous occasions, other American observers and visitors to the Soviet Union have pointed out that Soviet medical programs still do not meet Western standards.

In this regard, the findings of the U.S. Public Health Mission to the U.S.S.R. are to be particularly noted:

> The Mission found great divergence in medical facilities and in the quality of medical training. Almost everywhere, facilities were overcrowded; in several medical institutes there was a lack of proper working facilities, especially in the basic or preclinical sciences. . . .
>
> . . . The Soviet facilities were sufficient for demonstrations or examination of fixed materials, with heavy emphasis on museum material, microscopic slides, etc. Teaching appeared to be largely by demonstration rather than by student participation. . . .

[30] Appendix table IV–C–3; six of these are pharmaceutical institutes and two, stomotological institutes.

[31] See table VI–67 for the composition of Soviet physicians by specialty. The program for pharmacists and stomatologists lasts five years. Most dentists (*zubnoi vrach*) in the U.S.S.R. receive semiprofessional education, and only stomatologists—mostly oral surgeons—receive higher education and are classified as professionals.

[32] E.g., M. B. Shimkin, "Medical Education in the Soviet Union," in *American Review of Soviet Medicine*, vol. 1, No. 5, American-Soviet Medical Society, June 1944, 465–80; Ashby, *Scientist in Russia;* H. E. Sigerist, *Medicine and Health in the Soviet Union*, New York: The Citadel Press, 1947; M. G. Field, *Doctor and Patient in Soviet Russia*, Cambridge: Harvard University Press, 1957; A. Starr, "Medical Education in Soviet Russia," *Journal of Medical Education*," vol. 33, No. 12 (December 1958), 827–36.

[33] *Sovetskoe zdravookhranenie*, No. 5, 1959, p. 4.

[34] *VVSh*, No. 2, February 1959, p. 28.

[35] *Sovetskoe zdravookhranenie*, No. 5, 1959, pp. 3–9; *VVSh*, No. 1, January 1959, p. 36; No. 4, April 1959, pp. 64–66.

[36] Starr, *op. cit.*, 835.

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In many places, Soviet medical laboratory equipment was found to be antiquated. Training, research, and practice are fractionated and compartmentalized. The concept of the "university" climate as the essential broadening influence requisite for the development of first-rate physicians has been abandoned in favor of average training at the level of an average rank-and-file medical artisan.[37]

20. *Veterinary Medicine*

Supplement 2 to appendix table IV–B–18 presents a 4-year curriculum in veterinary medicine as of 1947. The total number of instruction hours was 5,584, and specialized instruction accounted for about 65 percent of these, general sciences 28 percent, and political indoctrination 7 percent.

Appendix table IV–B–18 presents a 5-year curriculum in veterinary medicine as of 1955. The additional year reduced the weekly instruction load and lengthened the practice assignment. The total number of hours was 5,350, with the ratio of lectures to laboratory-seminar-practice sessions about 4 to 6. The number of instruction hours devoted to individual subjects differed somewhat from the 1947 program, particularly physics (1947—324; 1955—90). There were also hourly reductions in diagnostic and clinical subjects.

An exchange mission which visited the U.S.S.R. in 1958 summarized its impressions of Soviet veterinary training as follows: [38]

The facilities are large enough to give considerable individual attention to students. The following table presents the number of students and faculty members as well as the faculty-student ratios of the veterinary medical institutions we visited:

	Students	*Faculty*	*Ratio of faculty to students*
Moscow Veterinary Academy	2,000	210	1:10
Georgian Zooveterinary Institute	350	75	1:5
Alma-Ata Zooveterinary Institute	1,125	173	1:7
Leningrad Veterinary Institute	500	138	1:4

. . . The curriculum is uniform for all schools of veterinary medicine throughout the U.S.S.R. . . .

For training in basic sciences, classes are divided into sections of 12 to 25 students for lectures and laboratory studies. Both laboratories and lectures utilize numerous visual aids. Laboratory rooms are small and, at the time of our visit, contained equipment of minimum standard in quantity and quality. Laboratories were not in session during our visit, but we were given the impression that laboratory exercises are demonstrations by the instructor.

Hospital facilities for both large and small animals are meager. Clinical courses utilize school hospitals, abattoirs, regional hospitals, and regional laboratories for training. School hospitals receive and treat sick animals only during months of school instruction. Hospital administrators indicated that horses and cattle, in approximately equal numbers, constitute the majority of cases treated. A small-animal clinic is maintained.

Students perform minor surgical operations at abattoirs on animals submitted for slaughter. Operations performed under these circumstances include dehorning, castration, neurectomy, eye ablation, rumenotomies, and Caesarean sections. Anesthetized animals are not slaughtered until several days after administration of anesthetic.

During the fourth and fifth years and the intervening summer, each student is assigned for 4 months to a regional hospital or farm where he receives training from the local veterinarian. Faculty members do not accompany their students.

On satisfactory completion of 5 years of professional training, as determined by comprehensive examinations at the end of each school year, the student receives a diploma that qualifies him to be examined by the Ministry of Agriculture for licensure to accept employment as a veterinarian. . . .

The certificate which the Soviet graduate veterinarian receives is difficult to equate to any of the four degrees given in veterinary medicine in the United States. Soviet training, even in the 4-year 1947 curriculum, appears to be more extensive than our 4-year undergraduate training. There is some temptation to equate the Soviet veterinary certificate with our D.V.M.S. degree, though the former is probably significantly inferior.

American programs usually place greater emphasis on general biology in the initial stages of training than on the general science subjects stressed in the Soviet programs. This is partly because the Soviet secondary schools devote 6 years to biology, thus reducing the need for general biology courses for higher education veterinary students. American programs certainly exclude the administrative courses which are required of the Soviet veterinary student, who upon taking employment often has ad-

[37] U.S. Department of Health, Education and Welfare, Public Health Service, *The Report of the United States Public Health Mission to the Union of Soviet Socialist Republics* (Aug. 13 to Sept. 14, 1957), Washington, D.C.: U.S. Government Printing Office, 1959, pp. 48, 50.

[38] U.S. Department of Agriculture, Agricultural Research Service, *Veterinary Science in the Soviet Union*, Report of a Technical Study Group, Washington, D.C.: U.S. Government Printing Office, October 1959, pp. 7–8.

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ministrative functions. The range of preclinical subjects in American programs is probably greater. Although clinical subjects consume about 32 percent of the total instruction time in the Soviet program, they are conducted for the most part as theoretical rather than applied courses, with less than a third of the time devoted to actual surgery or clinical practice in therapeutics.

In 1955 26 weeks were spent by veterinary students on practice assignments, but part of this time was spent not on veterinary medicine proper, but on various problems faced by the collective or state farm to which the student was assigned. In short, there were a number of diversions to narrow, applied, even nonmedical tasks.

21. *Agronomy*

Perhaps no other field of Soviet biological research and education has suffered more from political influences than agriculture.[39] Teaching in this field has been hampered by controversy and official dictates especially during the period 1947-53. After Stalin's death, it appeared for a while that the "geneticist" Lysenko's dictation over biology and agricultural subjects might be relaxed. The breathing spell was short-lived, however, and by the end of 1960 Lysenko was more firmly in the saddle than ever before, this time as one of Khrushchev's own protegees. Whatever future developments will be, in the past the quality of agricultural training has suffered considerably from political intervention and from a complete lack of objectivity about the basic principles of research essential to agricultural science.

Supplement 2 to appendix table IV–B–17 presents the curriculum in agronomy offered by Moscow's Timiriazev Agricultural Academy in 1945. Sir Eric Ashby considered it "noteworthy" for its "scrappiness." [40] The specialized subjects seem to be no more than trade subjects. The general science courses undoubtedly had substance, but they were probably overshadowed by the unique emphasis placed upon agricultural techniques, which are considered to be "infallible" under Soviet collective farming methods. To be noted also is the number of agricultural management courses required, an indication of the time Soviet agronomists must devote after graduation to office and administrative work rather than direct agricultural tasks.

Appendix table IV–B–17 presents the 5-year curriculum in agronomy as of 1955. The range of subjects did not change much from the earlier curriculum, although there was some revision in the time allotted to individual subjects. About one-half of the total instruction time (4,160 hours) was devoted to specialized agricultural subjects. The total instruction time and the number of required courses in Soviet agricultural higher education were substantially higher than that in American agricultural colleges. There is otherwise no real way of evaluating the true quality of the Soviet program.

The major Soviet criticism is that in many agricultural institutions "there is no independent work by the students . . . [they] attend lectures . . . are shown charts . . . but they don't learn to use [their knowledge]. . . . Future specialists lack skill, initiative and scientific comprehension." [41]

The 1959 reorganization of agricultural training programs called for more applied emphasis. Even before this, agricultural higher educational establishments had begun to "foster closer ties with production." In the years prior to 1956, 20 to 24 percent of instruction time was related to courses of a specialized, practical nature, or to practice itself. In 1957 up to 30 percent of instruction time began to be devoted to specialized study and production practice.[42] It is contemplated that most agricultural institutes, now located largely in the cities, will eventually be combined with state farms or agricultural experimental stations.[43] The suggestion that the length of the training be extended to 6 years was opposed as being "unnecessarily long," and it was proposed instead that there be 3 years of "theoretical education," 16 months of exclusive-

[39] C. Zirkle (ed.), *Death of a Science in Russia*, Philadelphia: University of Pennsylvania Press, 1949.
[40] Ashby, *Scientist in Russia*, p. 91.
[41] Ivanovich, *Sel'skokhoziaistvennoe obrazovanie*, p. 92.
[42] *Sel'skoe khoziaistvo* (Agriculture) (newspaper), Aug. 21, 1957.
[43] *VVSh*, No. 5, May 1959, pp. 17–22; *Sovetskaia Rossiia*, May 28, 1958.

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ly applied practice, and, instead of the diploma project, 8 months of on-the-job "assistantship training." [44] It was further suggested that where there were several small institutes, they be combined into a regional (*zonal'nye*) institute, with the hope that the applied instruction could thus be improved.[45]

22. *Teacher Education*

Soviet secondary school teachers (for grades 5–10 or 11) are trained in several types of institutions.[46] Some attend universities, but the majority of them today are trained in pedagogical institutes.[47] Until the mid- and late 1950's the most extensive facility for teacher training was not the 5-year university or 4- (or 5-) year pedagogical institute, but the 2-year teacher institute (*uchitel'skii institut*). All but one of these institutes have now been closed. Their program was based on some 2,500 hours of instruction, largely in subject matter courses. No official regulation has been found, but graduates of these institutes are probably accepted today as third-year students in pedagogical institutes.[48]

Until 1955 the training in pedagogical institutes lasted 4 years. The curriculum was based on 3,500 to 3,900 instruction hours, depending upon the subject area. About half of this time was devoted to subjects of the teacher's specialty. Beginning in 1956, pedagogical institutes began to convert gradually to a 5-year program.[49] Until then, the majority of secondary school teachers were trained to teach only one subject, but the programs introduced in pedagogical institutes since 1957 train "combination subject" teachers. No "general" teachers are trained.

The strong subject-matter orientation of Soviet education is reflected in the pedagogical institute programs, and is the most outstanding feature of teacher education in the U.S.S.R. About 60 percent of the instruction is spent on the future teacher's specialty and related subjects.[50]

A summary of the 1957 teacher training programs is presented in table IV–32. The 5-year program (except for physical education) requires between 4,100 and 4,900 instruction hours in 21 to 36 required subjects, with up to 19 optional subjects. Sixteen to 19 weeks are required for teaching practice assignments, and in addition, in some fields up to 29 weeks of industrial practice are required. About 14 percent of the instruction time is devoted to political subjects, a much larger proportion than in most other types of professional training. Usually the programs include general academic subjects, such as Russian language and literature, history, and art; a foreign language, as well as science subjects, are required regardless of the future specialty. There are examinations upon the completion of each course, in addition to a state certification examination (*gosudarstvennyi ekzamen*) at the end of the training, which tests knowledge of special fields and teaching methods.

Appendix table IV–B–20 presents the 1957 5-year curriculum of Soviet pedagogical institutes for training teachers of physics and the fundamentals of production. An analysis of its structure and comparison with the 1955 pedagogical institute program and university program in physics reveal some interesting differences, indicated in table IV–33.[51] In order to prepare students to teach not only physics, but also the fundamentals of production, the instruction time allocated to vocational physics in the pedagogical institute program increased markedly between 1955 (388 hours) and 1957 (906 hours). Although the proportion of time devoted to physics and other sciences and

[44] *VVSh*, No. 2, February 1959, pp. 26–27.
[45] *Ibid.*, No. 1, January 1959, p. 30.
[46] Note that preschool and the majority of elementary school teachers are trained in semiprofessional (normal) schools. See discussion in ch. III.
[47] Universities have traditionally trained teachers primarily for the upper grades (8–10 or 11).
[48] See, for example, notice in *Uchitel'skaia gazeta*, Apr. 29, 1959.
[49] *Zaria vostoka*, Oct. 13, 1956.
[50] See the comparisons of pre-1955 and post-1957 pedagogical institute and university programs in N. Dodge, "Recent Changes in the Training of Soviet Secondary-School Teachers," in Bereday and Pennar, *op. cit.*, pp. 144–63. For a general discussion of recent trends in teacher education, see W. K. Medlin, "Teacher Education," in U.S. Department of Health, Education and Welfare, Office of Education, *Soviet Education Programs*, Washington, D.C.: U.S. Government Printing Office, 1960, pp. 172–200. This source presents the post-1957 pedagogical institute programs for combination-subject teachers (appendix VIII, pp. 239–66).
[51] This is a reproduction of table V in Dodge's chapter on "Recent Changes in the Training of Soviet Secondary-School Teachers," in Bereday and Pennar, *op. cit.*, and uses his terminology. His "1957 university program" is the same as the 1955 5½-year university physics curriculum given in appendix table IV–B–4.

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TABLE IV–32.—*Summary of 5-year Soviet teacher training programs in pedagogical institutes, 1957* [a]

Specialty	Instruction budget in weeks				Total number of subjects [c]	Total hours		Examinations [d]
	Lectures	Examinations	Practice teaching [b]	State examinations		Number	of which lectures	
Russian language and literature, history (21XX)	149	29	19	8	26 (12)	4,434	2,538	37/44/4
Russian language and literature, foreign language (21XY)	149	29	19	8	21 (11)	4,574	1,692	36/33/3
Foreign language (21XZ)	150	28	19	8	23 (13)	4,824	948	33/43/3
Mathematics and technical drawing (21YX)	146	30	19 (2)	8	33 (19)	4,290	2,050	35/52/4
Mathematics and physics (21YY)	148	31	16 (2)	8	34 (18)	4,818	2,114	35/55/4
Physics and fundamentals of production (21YZ)	147	27	16 (7)	8	29 (15)	4,530	1,904	31/43/4
Biology, chemistry and fundamentals of agriculture (21ZX)	131	29	16 (29)	8	31 (15)	4,110	1,834	35/52/4
Geography and biology (21ZY)	141	24	16 (27)	8	36 (16)	4,484	2,347	38/51/4
Physical education (21ZZ)	107	20	17 (16)	8	26 (12)	3,446 plus 564 camp	1,214 plus 66 camp	27/40/3

[a] Physical education is a 4-year program.
[b] Figures in parentheses indicate the number of weeks the student must spend on industrial practice (full-time employment) in addition to practice teaching.
[c] Figures in parentheses indicate the number of additional subjects the student may choose as optional courses.
[d] The first figure refers to graded examinations, the second to qualifying examination, and the third to graded course project assignments.
Source: MVO, *Uchebnye plany pedagogicheskikh institutov* (Study Programs for Pedagogical Institutes), Moscow, 1957, *passim*.

TABLE IV–33.—*Physics programs broken down by course groups, pedagogical institute vs. university program*

Course groups	Pedagogical Institute				University	
	1955 [a]		1957 [b]		1957	
	Hours	Percent	Hours	Percent	Hours	Percent
Political	504	13.3	504	11.1	504	9.8
General	260	6.9	280	6.2	406	7.9
Education [c]	562	14.9	748	16.5	.....	.....
Mathematics	572	15.2	568	12.5	906	17.6
Physics and other sciences	1,488	39.4	1,524	33.7	3,192	62.1
Vocational	388	10.3	906	20.0	136	2.6
Total	3,744	100.0	4,530	100.0	5,144	100.0

[a] The 1955 pedagogical-institute program trained a student to teach astronomy as well as physics.
[b] The 1957 pedagogical-institute program trains a student to teach the fundamentals of industry as well as physics.
[c] Practice teaching is not included.
Source: N. Dodge, "Recent Changes in the Training of Soviet Secondary-School Teachers," in Bereday and Pennar, *op. cit.*, p. 157.

mathematics declined slightly (from 54.6 percent to 46.2 percent), there was an increase in the number of hours devoted to these subjects in the 1957 pedagogical institute program. It may be observed, furthermore, that the university program is stronger in mathematics and, particularly, in physics and other sciences.[52] At

[52] The interested reader should compare appendix table IV–B–4 with appendix table IV–B–20. The differences in the specialized physics subjects are particularly significant. The university program is designed to prepare either "physics teachers" or "research physicists." In the third year of the university program the authorities recommend the more competent students to proceed with the latter profile.

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the same time, the 1957 university program offered no "education" courses, while they accounted for 15 to 16 percent of the instruction time in both the 1955 and 1957 pedagogical institute program. The "education" courses are specific "method" courses rather than general pedagogy courses. Indeed, Soviet teacher training gives meticulous instruction concerning the use of textbooks, planning of classroom instruction, etc. (See ch. II.) In this regard Soviet training somewhat resembles American state teacher college training, though the teacher's instrumental role in the transmission of knowledge in a specific field is more pronounced in the Soviet Union. It has been noted:

> Soviet secondary teachers (i.e., from grade 5 up) and increasing numbers of elementary teachers, are . . . now receiving preparation similar in time period (but not in total hours) to that now received by corresponding American teachers. While the secondary teacher in the U.S.S.R. receives more instruction in subject-matter areas than does his average American counter-part, we noted certain deficiencies in the general education taken by the Soviet student. Professional training and practice in pedagogy are provided by Soviet programs in considerable measure, but we did not have opportunities to observe student teachers in action. According to criticism by some Soviet educators, facilities for, and the carrying out of, student practice need improvement.[53]

In the 4-year pedagogical programs before 1955 there were two 6-week practice teaching assignments, which in the five-year programs have been increased to as much as 19 weeks. It was proposed in 1959 that further modifications in the pedagogical institute curriculum provide for part-time employment (in schools whenever possible) of 4 to 6 hours per week during the first 3 years of study.[54]

A current problem in Soviet teacher training is that the changes in the secondary school curriculum recently introduced came at a time when there was an inadequate supply of teachers with vocational specialties.[55] Some schools have been forced to employ people who lack a pedagogical education, many of them skilled workers with less than 7-year education. In an effort to remedy this situation, new programs were designed and teacher retraining in a "supplemental profile" advocated. It was also proposed, in order to cope with the increased demand for teachers of the fundamentals of production course, that "engineering-pedagogical" divisions be set up at engineering higher educational establishments.[56] It is not known if these proposals were implemented.

In recent years pedagogical institutes have expanded their activities by opening 226 divisions to train elementary school teachers.[57] This is an important new departure, and it is now planned that pedagogical institutes will train not only specialty teachers *(uchitelia-predmetniki)*, but also "general" teachers for the elementary grades and also general teacher-class supervisors *(uchitelia-klassnye rukovoditeli* or *vospitateli)* for secondary schools.[58]

Soviet pedagogical education has in the past been completely separated from educational research. The RSFSR Academy of Pedagogical Sciences (and the network of pedagogical research institutes in the 15 republics) did research on methods of instruction, contents of courses, etc. Thus neither the students in the pedagogical institutes nor the faculty had an opportunity to "experiment" with teaching techniques.[59] In 1959 a drive got underway to use the schools as suitable places for applied educational research by faculty members of pedagogical institutes, together with their students assigned to teaching practice. It was hoped that this innovation would help to overcome the stifling effects of "standard teaching methods" on individual initiative and imagination on the part of the Soviet teacher.

23. *Fine Arts*

Like all other types of Soviet higher education, education in the arts is specialized. Just as higher education students in engineering or science do not get any courses in the humanities or fine arts, so arts "specialists" get no training in the sciences, mathematics or, for that matter, the humanities, unless it is directly related to their field of specialization. The training of the future painter, concert pianist, or

[53] Medlin, Lindquist and Schmitt, *op. cit.*, p. 205.
[54] *VVSh*, No. 7, July 1959, pp. 20–26.
[55] *Turkmenskaia iskra*, June 2, 1959.
[56] *VVSh*, No. 1, January 1959, p. 32.
[57] *Ibid.*, No. 4, April 1959, pp. 24–25.
[58] At the present time the teacher-class supervisor is a specialty subject teacher appointed to oversee the discipline, grading, and clerical chores in a given grade.
[59] *Uchitel'skaia gazeta*, Oct. 10, 1959.

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actor is as narrowly specialized, if not more so, as the engineer's or scientist's. The many world-famous Soviet performing arts groups—ballet, various musicians, dancers—are products of this highly specialized training.

There are separate institutions for each of the fine or performing arts—art and architecture schools, conservatories, theatrical schools, one school of cinematography and the Gor'kii Literary Institute.[60] Since these institutions are intended to develop the performing or expressive abilities of their students, they have no fixed curriculum. The main form of instruction is called the "creative seminar," which is either individual or small-group instruction. In addition, there are required courses in political subjects, physical education, foreign language and art history.[61]

The major criticism leveled by the Soviet regime at its arts programs is that most of the schools were concerned mainly with the education of "gifted" secondary school graduates from the large cities, that there was too much emphasis on "free creation," and that "success or failure depended too much on the mastery of technique, without regard to ideological orientation." [62] It was contended that workers seldom had a chance to develop their talents through formal higher education in the arts but that the new requirement of several years' work experience before admission should help to remedy this situation. "Particular attention" in admissions must be paid to the applicant's "moral and political outlook." [63] Aside from the demands for greater political conformity, the individualized approach in these areas will apparently remain.

24. *Higher Communist Party Schools*

A relatively unexplored area in Soviet higher education is the network of Communist Party schools which are recognized as offering "higher party—political education." [64] In the 1930's there were a number of these schools whose specific function was to train supervisory party personnel for industry and agriculture. At the present time they apparently train party functionaries for organizational work in economic activities and for work in mass communication media.[65] There are also "local party schools" (*mezhraionnye* [*mezhoblastnye*] *partiinye shkoly—MPSh*) which offer special training programs for these purposes. Curricula of these schools are presented in appendix tables IV–B–21A and IV–B–21B.

The 4-year program for newspaper workers requires 3,650 instruction hours, 41.5 percent of which is devoted to strictly political subjects, 26 percent to journalism subjects, and 32 percent to applied-technical and managerial subjects.[66] Schools for party functionaries have about the same number of hours over the 4-year period, but an even greater proportion of the instruction hours (43.5 percent) is devoted to applied-technical and managerial subjects. The party school curricula appear to be substantially weaker than those for regular higher education institutions offering either engineering or agricultural management programs.

Information on enrollment [67] and procedures in party schools is seldom discussed in Soviet sources. In 1956 there were at least 29 party schools officially rated as higher educational establishments. Students are selected on the basis of examination scores and party recommendation and must have been graduated from secondary school. The stipends are very generous, running up to 1,700 rubles per month, as compared with 210–315 rubles per month for students in regular higher educational establishments.

In addition to the *MPSh*, the Communist Party operates its own Higher Party School (*VPSh*). Nothing is known of the program of training, but it is definitely a select establishment for high-ranking party functionaries. In 1956 200 students were enrolled in its regular

[60] *APS-NarObr–1957*, pp. 448–52.

[61] The author did not encounter any officially approved "curriculum" for any performing or expressive arts field, except for one university program in the history of fine arts.

[62] *VVSh*, No. 8, August 1959, pp. 10–16.

[63] *Ibid.*, p. 12.

[64] Malin, *op. cit.*, p. 410.

[65] Editorial and most supervisory positions in mass communication fields require Communist Party membership of several years' standing. In addition, a mandatory requirement for admission to schools of journalism is party or Komsomol membership.

[66] Anyone who has read a typical Soviet newspaper, with its numerous items on "production activities," can understand the necessity for such courses.

[67] During the period 1946–55, 55,000 party functionaries were trained in these schools. Malin, *op. cit.*, p. 410.

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division and 3,000 in extension-correspondence branches.[68]

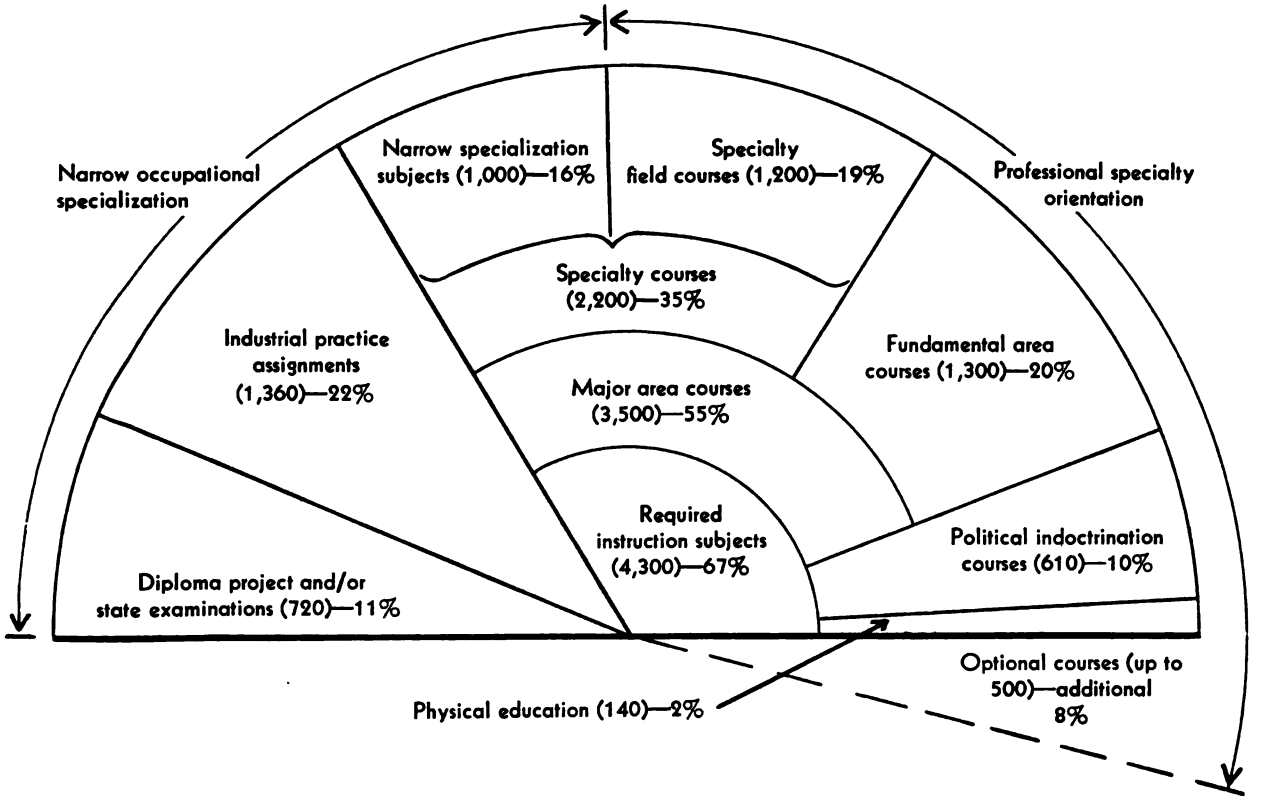
25. *Summary Appraisal of Soviet Higher Education Programs*

In the preceding sections we have described a variety of specialized professional programs offered in Soviet higher education. In addition to a specified number of classroom hours devoted to different curricular subjects and various types of instruction, the practice assignment, a diploma project and/or state examinations constitute integral parts of the general pattern of Soviet higher education. Despite the great diversity of specialties and the variety of programs, it is possible to single out some common features of all programs and construct a schematic picture of the general pattern of training programs in Soviet higher education. Chart XVII has been designed to summarize the overall pattern of these programs.

Any such construction is merely hypothetical, for the time devoted to the various areas may be slightly different in individual programs. Counting all types of activities, Soviet higher education programs require, during five to six years of study, an estimated total of 6,300 hours (not counting the student's outside preparation and study). Chart XVII shows schematically the different phases in the orientation of instruction programs: classroom instruction in required subjects, industrial practice, the diploma project, and optional courses. About two-thirds of all time input is devoted to required subjects

[68] *Idem.*

CHART XVII.—HYPOTHETICAL STRUCTURE OF INSTRUCTION PROGRAMS IN SOVIET HIGHER EDUCATION


Narrow occupational specialization
Narrow specialization subjects (1,000)—16%
Specialty field courses (1,200)—19%
Professional specialty orientation
Specialty courses (2,200)—35%
Industrial practice assignments (1,360)—22%
Fundamental area courses (1,300)—20%
Major area courses (3,500)—55%
Required instruction subjects (4,300)—67%
Political indoctrination courses (610)—10%
Diploma project and/or state examinations (720)—11%
Optional courses (up to 500)—additional 8%
Physical education (140)—2%

Source: Appendix tables IV—B—4 through IV—B—21. The hypothetical structure of instruction programs was made under the assumption that during practice assignments, students are required to work a 40-hour week and while the diploma project is being prepared or students are preparing for state examinations, they study also an average of 40 hours per week. The assumed grand total load is 6,330 hours for an average 5½-year program. Optional courses are not included in the distribution.

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of instruction specifically indicated in each curriculum. Included in these required subjects in all curricula are physical education and political indoctrination.[69] The rest of the time is devoted to major area courses. These in turn may be subdivided into fundamental subjects and specialty subjects, the latter again into broad and narrow specialization areas. If we consider the total requirement, about one-half of the student's time (including that for the practice assignment and the diploma project) is devoted to narrow specialization; the other half devoted to the professional specialty (about 39 percent) and the mandatory political indoctrination and physical education courses (about 12 percent).

The hypothetical number of hours indicated on the chart is valid as a crude approximation only, and in actual curricula the time inputs allocated to different phases may deviate by as much as 10 percent. In the allocation of time, the deviation is considerably smaller, with a variation of several percent from the hypothetical distribution.

In sum, the general pattern of Soviet higher education programs is that about 88 percent of the student's time must be spent on professional specialty training, about 39 percent of this devoted to fundamental and broad specialty courses, the remaining 49 percent to narrow occupational specialization.

The question naturally arises how such a pattern of higher education compares with that in the United States. An attempt to answer such a question usually leads to difficulty. In fact, there is no single answer; it depends entirely upon specialty field, even though it may be said without hesitation that the time inputs required in Soviet higher education are invariably greater than in the United States. It must be recognized that there is a certain amount of objective knowledge transmitted to the student in any higher educational system. In many scientific and engineering fields, as far as basic courses are concerned, it is apparent that Soviet higher education transmits about the same amount of, and at times more, knowledge as U.S. or West European institutions of higher learning. In the humanities and the social sciences, on the other hand, "objective knowledge" is transmitted only when it is coupled with a doctrinaire interpretation of communist dogma. In all cases, however, in every discipline—the natural sciences, engineering, the humanities, social sciences or arts—the Soviet higher education curricula are characterized by specialization, with the result that the student's education is made functional, applied and pragmatic. In some fields this is an asset for attaining the short-run technological goals of the Soviet economy; in others, it may have a petrifying effect upon the more important long-run development of creative thought. Whatever the case, Soviet higher education is aimed at developing competent specialists, the best possible, to suit Soviet circumstances. In general, the Soviet system of professional higher education does not even attempt to offer a general and broad humanistic higher education capable of implanting liberalizing, thought-provoking and critical intellectual activity in the realm of human values and social goals. Its sole objective has been and remains to develop the professional specialist who, to the best of his ability, performs the narrow, functional tasks assigned to him by the social planners.

The Instruction Process: Qualitative Factors

Instruction programs, curricula, thesis requirements, and practice assignments are all indicators of the extent and direction of Soviet higher education in the various specialized fields. In addition, there are a number of other factors which influence the quality of instruction. Two of these are teaching staffs and educational facilities, which are discussed below. We will discuss here several other factors affecting the quality of the instruction process itself.

Before doing this, one general comment concerning specialization, a feature so pronounced in all areas of Soviet professional education, is essential. The institutional setting of Soviet higher education is such that professional schools are physically separated from one another, an arrangement which was doubtless considered to be advantageous to the state in its

[69] Note that military training, which may account for an additional 10 percent of the total number of hours, is not shown on chart XVII since it is required only of male students without prior military service.

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drive to produce specialized manpower in the large numbers needed. The price which must be paid for the maintenance of a splintered network of professional schools is professional isolation. With few exceptions—notably in large universities—scholars and students alike in the Soviet Union have limited opportunity to communicate professionally with one another on a day-to-day basis. Together with the absence of academic freedom and the code of secrecy in a number of areas, there are obvious restrictions to the cross-field flow of ideas. Except for deliberate efforts in some areas of research to establish an interdisciplinary approach, Soviet higher education students and teachers find themselves on isolated professional islands, with little chance to benefit from the ideas of those in other areas. Soviet institutes and even universities are in effect the antithesis of the Western concept of a "university" as a community of scholars and a place for exchange of ideas. Compartmentalization of professional training may be considered one of the chief weaknesses of the Soviet higher educational instruction process.

1. *Instruction Methods*

As indicated by the curricula discussed above, the instruction time in Soviet higher educational establishments is about equally divided between lectures and other forms of instruction. Lectures are usually given by professors to large groups of students, and are one of the main forms of instruction during the first 2 or 3 years of study. Attendance is mandatory.[70] Usually the lecture materials require outside preparation and reading assignments. The "lectureship" technique and the routine note-taking by the students have been, however, a source of controversy.[71]

The purpose of the lecture in Soviet higher education is to offer a "full presentation" of a given subject.[72] The lectures do not usually involve a "problem approach" or include professorial comment, but rather are detailed expositions of the course material. The material may be gone over again in small group discussions led by a teaching assistant. Note-taking is considered necessary since the final examination is usually based on the lecture material.[73]

In addition to lectures, there is section instruction *(uprazhneniia)* for small groups in such subjects as mathematics, theoretical mechanics, physics, and foreign language. This type of instruction usually requires specific "homework" assignments. Another type of section instruction is the seminar, used commonly in the humanities, socioeconomic and political subjects and advanced specialized engineering and science subjects during the fourth and fifth years of study. Seminars may be conducted by either an instructor or a ranking professor, but it has been reported that they often deteriorate into formalized question-and-answer periods, particularly those on political subjects.

Laboratory instruction (*laboratornye zaniatiia*) in a variety of science subjects usually has two phases. One is designed to test the student's preparedness for laboratory exercises and consists of an assignment with a subsequent oral test on the use of equipment, setting up a laboratory experiment, etc. The second is the performance of the laboratory exercise itself, the results of which must be submitted in report form. Most of the laboratory exercises are "pre-set" according to the manual,[74] with specific instructions given as to method and grading.

During the last 2 years of study, some courses require an "independent study assignment." In the humanities and the social sciences these are usually term papers (*pis'mennye raboty*) assigned by the professor on a given topic. In engineering and applied fields they are computational or drafting problems (*raschetnografi cheskie raboty*), course projects (*kursovye proekty*), or other special assignments, which are usually supervised by the professor through individual consultation periods.

[70] A requirement not always observed; see *Leningradskaia pravda*, Nov. 23, 1956.

[71] For a general discussion, see *VyShkoSPR—1957*, p. 70. During the debate on the educational reforms, a proposal was made to make all lectures optional (*Sovetskaia Litva*, April 13, 1957), but it was widely opposed (numerous stories in *VVSh*).

[72] *VVSh*, No. 12, December 1958, p. 64.

[73] *VVSh*, No. 4, April 1959, p. 66. Note-taking has been criticized as not allowing the students to gain the "proper understanding" of the material presented and making them rely upon a "single source" (*ibid.*, No. 8, August 1957, p. 8, No. 4, April 1959, p. 38).

[74] *VVSh*, No. 5, May 1959, pp. 65–70. For a general discussion of laboratory procedures, see *VyShkoSPR—1957*, pp. 71–72.

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Most of the instruction techniques discussed above are commonly used in American higher education, but in the Soviet case more stress is put upon specific assignments. While it has been claimed that "great weight is assigned to the student's independent study and work with textbooks, equipment and primary sources," [75] numerous references in Soviet educational journals indicate that "independent study" actually consists of specifically assigned problems, study topics, or sections of textbooks, and thus does not involve free inquiry on the part of the student but rather regimented assignments on particular topics. What opportunity there is for genuine independent study is limited by rigidly prescribed learning procedures. The former Academy of Sciences President, A. N. Nesmeianov, has called the routine lecture attendance and notetaking, the performance of prescribed laboratory exercises and the digestion of assigned study materials the "passive acquisition of knowledge," which "gives work to the memory without overburdening it with active or creative thought." [76]

2. *The Instruction Load*

The instruction load required in most Soviet higher education programs usually exceeds that required in U.S. colleges and universities by a ratio of 2:1 or 3:2, depending upon the type of program and the year of study. The weekly instruction load in the Soviet Union ranges between 28 and 36 hours for all types of instruction—lectures, laboratory, classroom exercises, practice periods, etc. If we assume 15 to 20 lecture periods per week, each requiring at least 2 hours of outside work, the probable load of the Soviet student is between 70 and 90 hours weekly.[77] The Soviet press, refugee reports, and accounts by visitors to the U.S.S.R. all concur that most students are overburdened by such schedules.

"Overburdening" (*peregruzka*) has plagued Soviet higher education for decades, and has often been denounced. Although some cuts in the instruction load were made in the 1950's,[78] it still continues to be excessive.[79] In fact, the new part-time study—full-time employment programs will undoubtedly intensify such overburdening.

The main reason for the student's excessive schedule has reportedly been too many subjects (*mnogopredmetnost'*) in the curriculum.[80] The curricular approach in Soviet higher education has been one of "course study" (*kursovaia sistema*) rather than "subject area study" (*predmetnaia sistema*).[81] For example, the electromagnetic field theory may be included in the physics course, again in the basic electrical engineering course, and perhaps again in several applied courses, so that some courses duplicate material covered elsewhere. Each course is said to give the "fullest presentation" and loads material onto the student regardless of the need, availability of time or the fact that similar material has been covered elsewhere.[82]

The difficulty is, however, that course contents cannot be altered by the teaching staff without violating the "approved syllabus." Only as a rare exception may individual professors make up their own design for course contents; in general, only syllabi and textbooks approved by the central authority may be used.

Thus, the methods of instruction, the heavy load on the student, and the inflexibility of course contents are indicative of a basic dilemma in Soviet higher education: the desire to develop the individual student's abilities to the utmost within the framework of a centrally regulated and highly regimented education along narrow professional lines. The "broad theoretical academic preparation" the student is supposed to acquire in Soviet higher education is indeed difficult to reconcile with another of its fundamental aims—the strengthening of "standard" applied specialized instruction.[83]

[75] *Medynskii—1952*, p. 177.

[76] *VVSh*, No. 1, January 1959, p. 18.

[77] *VVSh*, No. 1, January 1954, p. 34, gives a specific example of the study load required of students during the third term at an engineering school. Out of 34 weekly instruction hours, 18 to 20 required 2 to 3 hours of preparation each, so that the total time involved was between 70 and 94 hours per week. In addition, of course, extracurricular activities, primarily of a political nature, are very time-consuming.

[78] In the 1930's and 1940's a weekly load of 36 to 42 instruction hours was commonplace; in the late 1950's it was reduced to 28–36 hours weekly.

[79] "Overburdening with formal academic chores is extremely heavy" (*VVSh*, No. 11, November 1959, p. 5). See also, among numerous other quotations on this subject, *ibid.*, No. 12, December 1959, p. 13.

[80] *Ibid.*, No. 10, October 1954, p. 3.

[81] See Stoletov's article in *Kommunist*, No. 16, 1958, pp. 72–85.

[82] See *VVSh*, No. 2, February 1959, p. 11: "The student's time should be economized and no overlap of material permitted."

[83] See Eliutin's article in *VVSh*, No. 6, June 1958, p. 5.

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3. *Examinations and Grading*

In order to graduate, the Soviet higher education student must have at least passing grades in all the subjects included in his program of study. Originally decreed in 1936 and still in effect today, the "sole criterion of the success of a student in a higher educational establishment is the passing of the final examinations and the qualifying credit tests on time as specified by the program of study." [84]

There are four descriptive grades in Soviet higher education: excellent (*otlichno*), good (*khorosho*), satisfactory (*udovletvoritel'no*),[85] and unsatisfactory (*neudovletvoritel'no*), or poor (*plokho*). The two higher grades—excellent and good—are considered honor grades, and to graduate with distinction a student must accumulate mostly "excellent" grades. Some courses, which certify the completion of an assignment or require qualifying tests before the student may take the final examination, use the terms "credit" (*zachteno*) or "no credit" (*ne zachteno*).

There are several kinds of examinations and grading procedures. In small group courses (such as in calculus) the student is graded on his regular homework assignments; a passing cumulative grade is a prerequisite for taking the final examination. In some courses, in addition, a written qualifying test (*zachet*) is given before the student may take the final oral examination. In courses where lectures and section instruction are combined, such as physics or chemistry, the student is almost invariably required to take a course credit test, the passing of which is a prerequisite to taking the final examination. Term assignments may be either graded or else given "credit."

Final examinations are either oral or written, or both. Oral examinations, which are the most common type, last about 20 to 25 minutes; written examinations usually last two hours. Written examinations have two or three questions which are asked of all examinees. Oral examinations have three to five questions printed on individual cards, which are drawn at random by the student. Upon drawing, the student is given time to prepare his answer and may be asked additional questions if it is not considered satisfactory for determining his grade. Most subjects have a final examination, and there may also be several course credit tests. Ordinarily, the final examinations are conducted by the professors, while the cumulative grading, the qualifying examinations and the course credit tests are handled by teaching assistants.

The total number of course credit tests and final examinations ranges between 70 and 90 during the 5- or 5½-year program.[86] These examinations are divided about evenly between qualifying tests and final graded examinations. They are taken during specially scheduled periods at the end of the academic term.

Three or more unsatisfactory grades at the end of any term usually result in dismissal. One or two unsatisfactory grades put the student on probation and he must take the examination over within 2 weeks to a month after the beginning of the following term. With the consent of the director, a student may, during the examination session, repeat an examination either because he failed it or else to try to improve his original grade. If the student still fails, and there are not more than two subjects involved, he may carry a "debt" (*khvost*), but he must take the examination again. If by the end of the spring term, however, any "debts" incurred by the student during the previous academic year have not been satisfied, he is either dismissed or, under rare circumstances, is permitted to repeat the year. It would seem, then, that if a student is really failing, he is expelled; but that if he is failing in one or two subjects (out of the six to eight required per term), he is given a chance to improve his grades through repeat examinations.

In the mid-1950's criticisms of the number and severity of examinations resulted in a decree limiting the number of final graded examinations in any term to five.[87] Other criticisms pointed out that the numerous examinations led to "grade chasing" (*pogonia za otmetkami*); nevertheless, as elsewhere, they are

[84] *VyShkoSPR—1957*, p. 13. Each higher education student is issued a "pass book" in which each of his examination grades is entered. Eventually, after the defense of the diploma thesis and/or the state examinations, all the grades are entered on his diploma certificate as well.

[85] Until 1954, called "average" or "passing" (*posredstvenno*).

[86] In some fields of study the number may be slightly higher. See the supplements to appendix tables IV–B–4 through IV–B–21 for the number of examinations in various programs of study.

[87] *VVSh*, No. 10, October 1954, p. 3.

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viewed essentially as the best method of evaluating the work of higher education students. How effective they actually are is another question. That they are not wholly accurate indicators of a student's ability would seem evident from the fact that repeated makeup examinations are allowed. In addition, little is known about the strictness in grading for different institutions. There have certainly been frequent complaints in the Soviet press about "liberalism" in this regard and demands for "stricter grading" procedures.[88]

At the end of each term, Soviet higher educational establishments prepare tabulations of the grades received by their students in each division. The results of the examinations following the 1955–56 spring term at Moscow State University are presented in tables IV–34 and IV–35. The data indicate that the rate of failure was extremely low (0.8 percent of all grades). Of the 797 students who failed, 582 received a "poor" grade in only one subject. What may be even more noteworthy was the rarity of merely "passing" grades: only 4.5 percent of the total. The overwhelming majority of grades were excellent or good (48.3 percent and 46.4 percent, respectively). This is undoubtedly an unusual distribution in comparison to American colleges. The grades achieved in Moscow State University may well not be typical of all Soviet higher educational institutions; nevertheless, the lack of grade differentiation is most striking.

There were differences in the pattern of grades according to university division with unusually high peaks of excellent grades in the divisions of biology–soil science (61.6 percent) and philosophy (62.5 percent) as compared with physics (41.9 percent). It is also worth noting that Communist Party members made higher grades than Komsomol members (the majority of students) or students without mem-

[88] In the past such "liberalism" has been tied in with the question of stipends. (See *SPM*, pp. 141–42.) See also: "The Problem of the Passing Grade and Student Stipends," *Literaturnaia gazeta*, July 1, 1954; *Sovetskaia Litva*, January 12, 1957.

TABLE IV–34.—*Moscow State University: Grades received on spring term examinations, 1956*

University division	Grades received at the examination												Qualifying test not passed or not taken	
	Total possible number of grades	Actual grades given								No grade given[a]			
		Total grades given	Among total—										
			Excellent		Good		Passing		Failing				
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	No. of students	No. of tests
Mathematics-mechanics	6,322	6,228	2,740	44.0	2,938	47.2	442	7.1	108	1.7	94	1.5	26	34
Physics	7,824	7,789	3,268	41.9	4,007	51.5	448	5.8	66	.8	35	.4	5	7
Chemistry	4,278	4,196	1,771	42.2	2,053	49.0	297	7.1	75	1.7	82	1.9	18	40
Biology—soil science	4,401	4,364	2,687	61.6	1,592	36.5	68	1.6	17	.3	37	.8	53	68
Geography	2,592	2,571	1,312	51.0	1,177	45.8	77	3.0	5	.2	21	.8	35	47
Geology	4,453	4,426	2,023	45.7	2,236	50.5	149	3.4	18	.4	27	.6	19	19
History	4,443	4,399	2,455	55.8	1,761	40.1	156	3.5	27	.6	44	.9	20	25
Philology	5,115	4,998	2,557	51.5	2,228	44.6	171	3.4	42	.9	117	2.3	65	75
Philosophy	1,505	1,483	926	62.5	529	35.6	19	1.3	9	.6	22	1.4	6	6
Economics	1,983	1,369	1,039	52.8	873	44.3	34	1.7	23	1.2	14	.7	12	17
Jurisprudence	8,856	8,743	4,020	45.9	4,282	49.1	395	4.5	46	.5	113	1.2	31	65
Journalism	3,237	3,220	1,430	44.4	1,541	47.9	230	7.1	19	.6	17	.5	6	6
Total	55,009	54,386	26,228	48.3	25,217	46.4	2,486	4.5	455	.8	623	1.1	296	409
Communist Party members	2,099	2,075	1,194	57.5	829	40.0	46	2.3	6	.2	24	1.1	5	5
Komsomol members	51,204	50,636	24,340	48.1	23,526	46.5	2,342	4.6	428	.8	568	1.1	277	382
Without party membership	1,706	1,675	694	41.4	862	51.5	98	5.9	21	1.2	31	1.8	14	22

[a] Presumably examination not taken.

Source: MGU, *Otchet*, Folio 16–17.

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TABLE IV–35.—*Moscow State University: Students' standing after spring term examinations, 1956*

University division	No. of students registered, Feb. 1956	Examinations deferred[a]	Students taking examinations, June 1956														
			Scheduled to take examinations	Present	Absent		Passed all examinations		With all grades "excellent"		With all grades "excellent" or "good"		Failed				
					With valid excuse	Without valid excuse	Number	Percent	Number	Percent	Number	Percent	Total		Number of examinations failed		
													Total	Percent	1	2	3
Mathematics-mechanics	1,470	35	1,435	1,363	37	35	1,283	89.4	207	16.1	924	72.0	152	10.6	113	29	10
Physics	2,005	180	1,825	1,798	25	2	1,749	95.9	286	16.4	1,248	71.4	76	4.1	54	19	3
Chemistry	1,064	27	1,037	989	34	14	924	89.4	140	15.2	627	67.8	113	10.6	85	17	11
Biology-soil science	1,285	38	1,247	1,211	36	.....	1,196	96.0	407	34.0	748	62.5	51	4.0	48	3	.....
Geography	750	25	725	705	13	7	702	96.9	170	24.2	487	69.3	23	3.1	20	3	.....
Geology	1,043	39	1,004	980	11	13	967	96.4	160	16.5	718	74.3	37	3.6	30	6	1
History	958	30	928	898	30	.....	876	94.3	203	23.2	602	68.7	52	5.6	34	17	1
Philology	1,102	48	1,054	978	57	19	940	89.2	199	21.1	673	71.5	114	10.8	75	35	4
Philosophy	305	5	300	287	9	4	283	94.3	75	26.5	192	67.8	17	5.6	9	1	6
Economics	537	13	524	512	11	1	494	94.3	138	27.9	338	68.4	30	5.7	23	7	.....
Jurisprudence	1,723	13	1,710	1,644	66	.....	1,606	93.3	272	17.0	1,182	73.8	104	6.1	69	15	20
Journalism	722	33	689	675	14	.....	661	95.9	103	15.5	415	62.8	28	4.4	22	4	2
Total	12,964	486	12,478	12,040	343	95	11,681	93.7	2,360	20.2	8,154	69.8	797	6.3	582	157	58
Communist Party members	470	25	445	430	14	1	427	96.0	120	28.1	277	64.9	18	4.0	11	2	5
Komsomol members	12,095	445	11,650	11,249	311	90	10,907	93.7	2,176	19.9	7,621	69.9	743	6.3	547	147	49
Without party affiliation	399	16	383	361	18	4	347	90.6	64	18.4	256	73.6	36	9.4	24	8	4

[a] Due to leave, illness, practice assignment, etc.

Source: MGU, *Otchet*, Folio 16–17.

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bership in either organization. In this connection, Soviet refugee reports have indicated that professors were sometimes reluctant to grade active party (or Komsomol) members too harshly.[89]

In conclusion, it may be noted that since most final examinations are oral, the personal judgment of the professor may be a factor, one which cannot of course be measured objectively.

4. *Textbooks*

In the early and mid-1930's there was an acute shortage of textbooks in every field of professional training, as well as a complete lack of good texts in some areas. Toward the end of the 1930's large editions of new titles began to appear. Because of the policy of "standardizing" textbooks and of the requirement for textbook approval by the central organs, it is not uncommon even today to find texts in fourth, fifth or even later editions. The writing of new textbooks in many fields proceeded slowly, and although figures on the publications of new texts may seem impressive, many of those still in use were published 20 and 30 years ago. For example, of the textbooks published in 1958, 10 were the 5th or 10th edition, 11 were 11th to 19th edition, and 35 were current "reprints" (i.e., 2d to 4th edition.)[90]

In the mid-1950's some 260 to 300 textbooks and study aids were reportedly published annually for a total of 7,000,000 copies, but the needed number was considered to be 20 to 22 million,[91] since students still had difficulty in getting their own copies. Soviet students usually do not buy their textbooks, but borrow them from the library of the higher educational institution for the academic year. Libraries, also, however, "often have an insufficient number of copies."[92]

As to content, it is pretty generally recognized that Soviet social science and humanities textbooks usually suffer from political bias.[93] Textbooks in engineering, the sciences, and various applied fields are not so severely affected, although many of these also include in their preface or conclusions some "appropriate" quotations of Lenin, Stalin, or Khrushchev.[94] There also exists a wide body of Soviet scientific and engineering texts in special fields which are classified as secret information,[95] whose quality therefore cannot be judged.

Many Soviet textbooks are prepared on consignment resulting from a competition (*konkurs*) for writing the best text, a practice especially common in the area of political and social sciences.[96] Competitions may be "open" or "closed." If "open," any organization, individual author, or group of authors may submit manuscripts along specified lines, and a panel of reviewers (actually called a "jury") chooses the most promising manuscript, for which it awards a prize. "Closed" competitions are restricted to either a certain institution or to certain individuals. Besides the competition method, many textbooks are written outside of the competitions and are submitted to the educational authorities for approval. The actual selection of manuscripts for textbooks, no matter how they are prepared, takes place "behind closed doors," with no recommendations or reasons for rejection made public.[97]

In terms of monetary rewards, the writing of textbooks which are put into use is one of the most lucrative undertakings in the Soviet Union, provided that one has the time to devote to such a task. However, since a textbook is usually a mirror of one's knowledge of a given sub-

[89] This point has also been brought out in a Soviet novel—F. Panferov, *Volga—Matushka reka* (Volga—Mother River), Moscow, 1954, pp. 184–86.

[90] *VVSh*, No. 6, 1959, p. 21. One organic chemistry textbook (by A. E. Chichibabian) has been in use since 1926, without revision. For a general discussion of Soviet textbook publishing, see Gorokhoff, *Publishing in the U.S.S.R.*, *passim*.

[91] *Eliutin-VSSS—1959*, p. 69.

[92] *Idem*.

[93] For an outstanding analysis in one area, see F. M. Snowden, Jr., "Observations on Some Soviet Textbooks for English Language Instruction," *The Educational Record*, April 1960, 1–15.

[94] There is an unconfirmed report that the main library of the U.S.S.R. Academy of Sciences maintains a "quotation file" for the use of scientists wishing to find a quote on any subject from the "classics of Marxism-Leninism."

[95] Occasionally there are reports on these in the Soviet press. See *Kommunist*, Aug. 8, 1956; *VyShkoSPR—1957*, p. 285 (on classified advanced degree theses). On his visit to the United States in 1959, Mr. Prokofiev, the Deputy Minister of Higher and Secondary Specialized Education, claimed that most such texts have now been released to the public.

[96] One such recent competition was held for a new textbook on political economy and Marxist philosophy. The ultimate selection was to be made by the Academy of Social Sciences of the Central Committee of the CPSU and the Institute of Philosophy of the U.S.S.R. Academy of Sciences (*Pravda*, Apr. 4, 1959).

[97] *VVSh*, No. 6, June 1959, p. 21.

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ject and his methodology of teaching it, and since most textbooks, despite prepublication approval by special committees, are mercilessly reviewed [98] in the Soviet press, anyone who undertakes such a task may find himself in a precarious situation. Thus despite the material rewards of textbook writing, many qualified persons shy away from it for fear of being arbitrarily accused of political or ideological "deviations." Such accusations, however, are less frequent in scientific-technical fields.

Textbooks fall into several general categories. First, there are many engineering texts which are exhaustive, voluminous discussions of a technological nature, with charts, drawings, and diagrams of everything up to the last standardized design of bolts or rivets. Some of these should be regarded as technical manuals rather than textbooks and they are often too voluminous for effective use by the student. Usually they are written by a group of experts rather than an individual. However, since technological change is frequently rapid in an expanding economy, many of these books are obsolete within a few years; nevertheless, for one reason or another, the original may be revised time and again.

In general science textbooks, the subject matter is as a rule presented in traditional fashion. Prior to the mid-1950's there was a tendency to shy away from controversial hypotheses, advanced topics based on recent scientific discoveries, and the philosophical implications of science. There has been some relaxation in this regard since the mid-1950's.

One Soviet complaint in regard to textbooks is that "it is easier to write on a subject already known and as a result, new and advanced fields suffer." [99] In order to counteract such a situation, the Soviet authorities translate and publish, in scientific and engineering fields particularly, a great many European and American texts and advanced treatises. In fact, Soviet exploitation of Western literature has assumed a great magnitude and its importance lies not only in textbooks for higher education training programs but also in keeping Soviet scientists and technicians informed.

[98] It is an old Russian literary tradition, carried over to the Soviet period, to review textbooks in a highly critical vein.
[99] *Ibid.*, No. 5, May 1959, p. 25.

5. *The Use of Movies as a New Instructional Device*

At the present stage of Soviet higher education development, all instructional efforts in the direction of part-time education have particular importance. Among these, the increasing use of educational films, which are also suitable for use on TV, is noteworthy.[1] The producing unit and clearinghouse is the Central Movie Laboratory (*TsKL*) of the Ministry of Higher and Secondary Specialized Education.

This organization is of considerable importance. Individual higher educational establishments (and also research institutes) may have movie-photo laboratories, and large institutions, *MGU* for example, may even have departments of "scientific and instructional cinematography." [2] These laboratories and departments either do their own photographic work and processing or else have contracts with scientific film studios or with the Central Movie Laboratory. Regardless of how the movie is produced, however, the Central Movie Laboratory must receive a copy and it is given the distributing rights.

The use of movies in teaching has been particularly prominent since 1955.[3] The Central Movie Laboratory has reportedly aided a number of "specialized research establishments, higher education institutes and military organizations in setting up and operating smaller movie laboratories and research movie groups." [4] The current educational reform proposes to make wide use of instructional and research films in higher education,[5] and 150 full-length instructional films and 500 shorts

[1] *Ibid.*, No. 4, April 1959, p. 3. The use of movies, until recently, was relatively insignificant. For a general survey, see *ibid.*, No. 6, June 1958, pp. 56–71.
[2] Moscow State University has a Department of Scientific Photography and Cinematography. See I. N. Biriukov, "Liuminiatsentnaia prizhiznennaia mikrokinos'emka" (Luminescent Techniques of Microcinematography of Living Organisms), *Zhurnal nauchnoi i prikladnoi fotografii i kinematografii* (Journal of Scientific and Applied Photography and Cinematography), No. 3, 1956, pp. 209–22.
[3] *VyShkoSPR–1957*, pp. 186–90.
[4] B. V. Kubeev (comp.), *Nauchnaia kinodokumentatsiia vypolnennaia v vuzakh v 1948–57 godakh* (Scientific Documentary Movies Produced in Higher Educational Establishments in 1948–57), Moscow, 1958, p. 4. This is an apparently censored (through omissions) MVO compilation of research movies, some of which were made in connection with advanced degree dissertations and the majority for research purposes, which are available to various institutions.
[5] See appendix I–ERL.

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are scheduled to be made during the current Seven-Year Plan.[6]

The quality of Soviet science and instructional films is not known. American observers attending the Twelfth Conference of the International Science Film Association in Moscow in 1958 were inclined to judge the Soviet effort as uneven, the strongest and most imaginative films being in the popular science areas.

6. *Laboratory Equipment and Research Facilities*

Soviet professional education, as indicated, places extensive emphasis on applied instruction, whose quality is largely dependent upon laboratory equipment, visual aids, models, etc. Depending upon specialty, up to 40 percent (chemistry) of a student's time is allocated to laboratory instruction.[7] While the equipment has been called "excellent,"[8] there have been numerous complaints about the shortages of instruments, machinery, laboratory equipment, chemicals, etc.[9] Undoubtedly the quality and supply vary from institution to institution.

Another consideration involved here is that many Soviet higher educational establishments engage in special research or development projects for industry. After the 20th Party Congress in 1956, renewed emphasis was placed on such activity, especially in applied fields, in an effort to bridge the gap between theoretical (usually financed through the state budget) and applied research (contracted from industrial enterprises directly and financed by industry funds).[10] In 1956 the funds allocated to higher educational establishments by industry amounted to 200 million rubles, but by 1959, when about 190 special laboratories of higher educational establishments were engaged in contractual research, had increased to 450 million rubles.[11]

This development had the beneficial effect of securing additional financing for equipment and for staff activities and also has stimulated student participation, the latter through student research organizations (*studencheskie nauchnye-obshchestva—SNO*). In 1959 about 200,000 students reportedly participated in these research activities.[12] The merging of several research establishments with higher educational institutions in 1960 would seem to indicate further participation in research on the part of the higher educational establishments. One indication of the quality of these research activities is that of the 459 works submitted for Lenin Prize awards between 1947 and 1959, 48 came from higher educational establishments, and they received 9 of the 50 prizes awarded.[13]

7. *Choice of Field as a Qualitative Factor*

Since a Soviet higher education student must indicate his choice of specialty at the time of application and, upon graduation, take employment in an occupation identical with or closely related to the specialty in which he has been trained, he is likely to choose a field which coincides with his abilities and inclinations and also offers the best chance for the fulfillment of his career expectations.

In addition, since there is a high value placed on certain kinds of professional training, and since some specialties lead to positions offering higher incomes and other material comforts than others, many students choose their specialty on the basis of these differential rewards. Administrative and managerial positions, scientific research, engineering, university teaching, medicine, agriculture, secondary school teaching, other social service occupations—these represent a sequential chain of diminishing monetary re-

[6] *VVSh*, No. 4, April 1959, p. 55.
[7] *APS-NarObr—1957*, p. 406.
[8] *Medynskii—1952*, p. 176.
[9] See *VVSh*, No. 2, February 1952, p. 15, No. 4, April 1951, p. 7, No. 3, March 1955, p. 29; *Izvestia*, Feb. 8, 1955; *Kommunist*, December 7, 1957; *Pravda*, April 25, 1957; and a number of articles in *VVSh* during 1959 and 1960.
[10] *Promyshlenno-ekonomicheskaia gazeta*, November 23, 1956; major regulations may be found in *VyShkoSPR—1957*, pp. 213–55.
[11] *Pravda*, February 4, 1959 (Eliutin); *VVSh*, No. 2, February 1959, pp. 5–6. Beginning in 1958, a list of the important research undertakings has been published. See *Perechen' vazhneishikh nauchno-issledovatel'skikh rabot vypolniaemykh VUZami* (List of Research in Progress in Higher Educational Establishments), Moscow, 1958 (two volumes, one for natural sciences, the other for social sciences). There are also 22 serials, *Izvestia VUZ'ov* (Journals of Higher Educational Establishments) in different fields reporting such activity.
[12] *VVSh*, No. 4, April 1960, pp. 51–56.
[13] *Ibid.*, No. 6, June 1959, pp. 10–12.

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wards. There is also honorific acclaim which is associated with certain fields of study.[14]

Because occupations can be changed only with great difficulty, there is greater pressure toward the "prize" occupations. Engineers and scientists top the list, and therefore institutions offering this training usually have the greatest number of applicants (and in turn can place greater demands upon the student and thus maintain high standards). Thus the placement policy and the attraction of certain occupations have a qualitative effect upon Soviet professional training.

Another consideration in regard to choice of specialty is that there are undoubtedly certain occupations where the impact of the ever-changing political ideology is more heavily felt than in others. Such areas as biology, agriculture, history, economics, the humanities and social sciences, aside from offering smaller financial rewards, are in general more politically hazardous as well. Training in these fields is less attractive than in other fields where the possibility of political intervention is small. The applied sciences, engineering, medicine and even secondary-school teaching (though the latter two are not relatively well-paying occupations) are therefore more attractive than certain other fields.

Finally, the career choice may be influenced not only as among fields, but within a field itself due to the differential standards of the institutions offering the same specialty. Training in a given specialty in a first-rate school promises more in the way of better initial job placement than similar training in a school with not so high a reputation.

8. *Student Accommodations*

Among the several material factors which may influence a student's career choice in the Soviet Union are the accommodations available in higher education—dormitories, dining halls, recreational opportunities, etc.

Since most Soviet higher educational establishments are of the "city college" type, dormitory space is a particularly important consideration. The availability of student dormitories either as part of the institution's buildings or nearby, is an inducement, if not a necessity, for the student not living in the city where the institution is located, particularly in view of the well-known general housing shortage in the Soviet Union.

In 1938 the all-time high in the proportion of all higher education students living in dormitories was reached, when 70 percent of regular students were so accommodated.[15] In the 1940's, particularly during World War II, when many dormitories were converted into hospitals, some students began to be accommodated in rented quarters. The declining proportion of students living in dormitories in the 1950's is evidenced by the following percentages:

	1951	*1952*	*1953*	*1955*	*1956*
Proportion of regular (day) students living in dormitories	44.5	43.4	41.0	40.0	40.0
Proportion of regular (day) students living in rented quarters	12.1	14.1	15.8	14.8	10.1

Thus in 1956 only one-half of all regular full-time students lived either in student dormitories or in rented quarters.[16] The other half presumably lived at home, in or near the city where the higher educational institution was located.

Student dormitories are subsidized almost entirely from the Soviet education budget, and the student pays a nominal fee (up to 20 rubles per month) for residence privileges. In addition, he must pay for meals. Soviet accounts usually depict student dormitory life as comfortable and carefree,[17] but this has not been the impression of American exchange students and visitors or, always, of Soviet authorities themselves. One of the latter reported life in the dormitories as highly unattractive; the rooms were small, poorly furnished, and unkempt; the lighting was poor; and recreational facilities

[14] Graduates of several elite schools, such as Moscow State University or the Bauman Higher Technical School, are entitled to wear special badges (*nagrudnyi znak*) of their schools, as a symbol of prestige (MGU, G. D. Vovchenko [ed.], *Moskovskii Universitet: Kratkii ocherk* [Moscow University: Short Description], Moscow, 1956, p. 15). Beginning in January 1961 a diamond-shaped badge with different emblems and colors for the various specialties was introduced in all higher educational establishments (*VVSh*, No. 11, November 1960, p. 85).

[15] Komarov, *Ekonomicheskie*, pp. 139–40.

[16] See *Kommunist*, No. 15, 1957, p. 168. Most statistics on dormitory accommodations do not differentiate between student dormitories and rented quarters.

[17] See, esp., M. Mikryukov, *Students of Moscow University* (English), Moscow, 1958, *passim*.

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were lacking.[18] As with other quality factors, there are undoubtedly some institutions which have better facilities than others. Perhaps in keeping with the new drive to improve the ties between "school and life," dormitory students are now engaged in "self-service" chores and are assigned various maintenance chores in the dormitory buildings.[19]

9. *Military Training and Physical Education*

The preferential treatment of Soviet higher education students in regard to military obligation has already been noted in chapter 1. All male higher education students who have not served in the armed forces are required to take several hours per week of military training, including drill, the use of small arms, tactics, map-reading, etc. This is supplemented by required physical education, which stresses gymnastics rather than organized sports.[20] The latter are emphasized also, but as an extracurricular activity.[21] In addition, a paramilitary organization called the *DOSAAF* (formerly the *Osoviakhim*) provides additional military training in the form of extracurricular activity, which, though called "voluntary," is often compulsory. Despite exemption or deferment from active military duty, most male students thus receive a certain amount of basic military training in the higher educational establishments themselves.

10. *Political Indoctrination*

Political indoctrination courses are a curricular feature common to all Soviet higher education programs.[22] Such indoctrination is supplemented through a variety of extracurricular activities, particularly those under the auspices of the Komsomol and the Communist Party itself.[23] The overwhelming majority (probably 95 percent) of higher education students today are Komsomol members.

In indocrinating Soviet youth, the Communist Party is guided by Lenin's words: "Any belittling of communist ideology or shunning away from it constitutes the strengthening of alien bourgeois ideology." [24] It has been stated: "The teaching of Marxism-Leninism must be creative, aggressive and militant. It must educate all youths to be totally intolerant to any manifestations of bourgeois ideology and any occurrences of revisionism." [25] As Khrushchev put it: "We never hide the fact that we were and will be mobilizing everyone for principal ideological war. In the contemporary world there is a deathly struggle between two world ideologies—socialist and bourgeois—and in this struggle there cannot be any neutrals." [26]

In accordance with a decision of the Central Committee of the CPSU on June 18, 1956, three separate courses—political economy, dialectical and historical materialism, and the history of the Communist Party of the Soviet Union—were made obligatory for all higher education students.[27] Although the number of hours devoted to these courses may vary from program to program, most of them consume at least 8 percent of the total. The training is supervised by a special division of the Ministry of Higher and Secondary Specialized Education: the Central Administration on the Teaching of Social Sciences, which coordinates the activities of some 1,200 departments conducting indoctrination courses in Soviet institutions of higher learning. The history of the Communist Party as a rule is taught in the first through fifth terms; political economy, sixth through eighth terms; and dialectical and historical materialism,

[18] *Kommunist* (Armenia), March 2, 1957.
[19] *VVSh*, No. 2, February 1959, pp. 59–62.
[20] The importance of physical training in the Soviet educational program may be evidenced by the recent establishment of a special commission set up at the Division of Physical Education of the Ministry of Higher and Secondary Specialized Education to develop new physical education programs for higher education students (*SSO*, No. 8, 1959, p. 47).
[21] Conducted largely by the national sports association for students, the *Burevestnik*, which has clubs in 508 higher educational establishments and a total membership of 431,000 students (*Eliutin-VSSS—1959*, p. 60).
[22] The political indoctrination of higher education students ranks high in the roster of educational problems. Almost every issue of *VVSh* devotes 10 to 30 pages to this topic.
[23] *Komsomol'skaia rabota v VUZ'e* (Komsomol Work in the Higher Educational Establishment), 10 essays, Moscow, 1953; *O partiinoi rabote v VUZakh* (Concerning Party Work in Higher Educational Establishments), Moscow, 1958.
[24] Lenin, *Sochineniia*, vol. 5, p. 356.
[25] *Eliutin-VSSS—1959*, p. 53.
[26] N. S. Khrushchev, "Za tesnuiu sviaz' literatury i iskusstva s zhizn'iu naroda" (Toward a Firm Link between Literature and Art with the Life of the People), *Novyi mir*, No. 9, 1957, pp. 3–22.
[27] Malin, *op. cit.*, p. 320. See also the ordinances of the Ministry of Higher Education in *VyShkoSPR—1957*, pp. 80–84.

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eighth through tenth terms.[28] An examination of their syllabi [29] indicates that these courses are exactly what they intend to be: pure political dogmatism extolling the virtues of communist ideology and of the Soviet social institutions and way of life as the "most progressive" and "most just" in the world.

The Soviet approach to political indoctrination is essentially bifocal. One is the exaggeratedly successful, embellished and idealized vision of the Soviet scene; the other, its contrasting counterpart—the evil, unjust, strife-torn and greedy societies of decaying world capitalism. These two approaches complement each other in the psychological makeup of the "new Soviet man," who is made to think of himself as a superior human being, with virtues beyond compare, the product of a superior social order, a man endowed with the historic mission of leading mankind to its inevitable destiny—the triumph of world communism.

The ultimate aim of political indoctrination is thus obvious: "Soviet higher educational establishments are not called upon to train just competent specialists, but dedicated . . . and selfless patriots of our socialist fatherland." [30] One cannot help but wonder, however, at the vast number of stories [31] complaining of the inadequacy of the "ideological upbringing" and education in the "spirit of communism." The Communist Party itself has a simple answer: "widespread indifference [*ravnodushie*] toward learning Marxism-Leninism." [32] The teaching of topics of dogma is done by rote and evokes accusations of "formalism" rather than conscious understanding and acceptance of the doctrines.

However passive the acceptance of communist dogma may be, undoubtedly there are residual effects. Certainly some of the welfare aspects of the Soviet regime are consciously accepted. The successes, it is claimed, derive from the "system" and inefficiencies and repugnant aspects are ascribed to human failure. This theme is repeated over and over again in a thousand different ways until it is accepted, either consciously or subconsciously.

Quantitative Trends in Soviet Higher Education

Quantitative trends in the selection and admission of students to Soviet higher educational institutions, together with relevant data regarding first-year entrants into these establishments, have already been examined in an earlier section of this chapter. The present section will continue the analysis of quantitative trends with particular reference to enrollment levels, graduation rates, and distribution of students by sex, social origin, and nationality.

As noted previously, there have been three major stages of higher educational development in the Soviet Union since 1928. The first was the stage of initial expansion in the early 1930's, in which major emphasis was placed on professional training in fields related to production, such as engineering and agricultural techniques. In the second stage, from the late 1930's to the early 1950's, the primary emphasis shifted to training professional personnel for the social service occupations, particularly teachers and doctors, who were turned out in proportionately greater quantity than other types of professionals. The third stage covers the period from the early 1950's to the present and continuing through the early 1960's. It is characterized by renewed emphasis on training in production-related engineering fields, supplemented by professional economics training, and in agriculture.

Except for a period of practical suspension during World War II, both the second and third stages of development have been characterized by an expansion of part-time higher education, which was recognized as fully equivalent to regular higher education in the late 1930's. Extension-correspondence training at the higher education level was restored to its prewar status

[28] *VVSh*, No. 8, August 1959, p. 31. See also the curricula presented in appendix tables IV–B–4 through IV–B–21.

[29] *Administration of Teaching in Social Sciences in the U.S.S.R.* (translation of Russian "Syllabi for Three Required Courses: Dialectical and Historical Materialism, Political Economy, and History of the C.P.S.U.", Moscow, 1957), Ann Arbor: University of Michigan, 1960. There is also a new textbook on communist doctrine: *Osnovy Marksizma-Leninizma: Uchebnoe posobie* (Fundamentals of Marxism-Leninism—Textbook), Moscow, 1959.

[30] *Sovetskaia Rossiia*, September 11, 1959.

[31] It is not exaggeration to say that several thousand quotations may be found in Soviet newspapers and periodicals dwelling on the shortcomings of the political indoctrination and character education of higher education students.

[32] Malin, *op. cit.*, p. 348.

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at the start of the 1950's, and thereafter received steadily increasing emphasis, culminating in the 1958 reform program which calls for the introduction of evening and extension-correspondence programs even in regular full-time higher education.

1. *Total Enrollment*

Chart XVIII shows the trend of total enrollment in all types of Soviet higher educational establishments since the beginning of the communist regime.[88] Although some expansion occurred shortly after the Revolution, enrollment during the mid-1920's remained at the level of about 160,000, only some 35,000 over the pre-revolutionary figure. Indeed, World War I and the Communist Revolution had the effect of stunting the development of higher education in Russia for fifteen years. Official policy in this period was deliberately calculated to curb, if not to destroy, higher education as a bastion of bourgeois culture. The intelligentsia and professional class were looked upon with contempt and suspicion as socially alien elements in a proletarian state. The stagnant economy of the 1920's had little need for highly trained professional manpower, and the state had no immediate desire to expand such training.

The year 1929 marked the beginning of a new era. The Soviet regime embarked upon a program of rapid industrialization, which demanded ever-increasing numbers of trained specialists. Proclamations, directives, and a multitude of speeches by party leaders emphasized the need for expanding education in general and the training of specialists in particular. Stalin coined a new slogan, "Cadres decide everything," which meant that the whole industrialization effort depended for its success on the training of technicians. A feverish expansion of enrollment began at a time when there was a lack of facilities, of qualified teachers, and of adequate training programs. Between 1929 and 1932 (i.e., the First Five-Year Plan, which actually last only 4 years), enrollment jumped two and a half times, reaching over 500,000 in 1932. Enrollment in extension-correspondence programs was not significant, numbering some 40,000 students in 1929, after which it dwindled to nothing by 1932 and then began expanding again. (Extension-correspondence training was not considered part of regular higher education during this period and was reported under the category "course studies" until its formal recognition in 1938.) Enrollment in all Soviet higher educational establishments in 1932 was somewhat less than half the resident college enrollment in the United States in 1930 (about 1,100,000).

Overexpansion during the First Five-Year Plan accounted for a drop in enrollment in 1933. This decline has usually been attributed by Soviet sources to the "reorganization" of higher education carried out between 1931 and 1934. But there were other causes also, chief among which was the dislocation of Soviet society brought on by the regime's drastic agricultural collectivization drive, the famine caused by it, and other disruptive factors.

The 1931–34 reorganization measures effected a lengthening of training programs, the restoration of traditional methods of instruction, a strengthening of discipline, the introduction of individual grading (as opposed to group grading), and a score of other changes. They thus laid a new foundation for Soviet higher education and imparted to it a basic functional orientation which continued without much change until the reforms of the late 1950's. By 1934 enrollment had reached a level of about 527,000, and during the next 4 years it remained more or less stationary between 520,000 and 560,000. In order to make up for this stagnation in regular higher educational enrollment, extension-correspondence programs were recognized as equivalent to regular full-time courses in 1938. Between 1937 and 1939, enrollment increased by some 100,000, reaching 620,000 in 1939, a figure which was still less than one-half the higher educational enrollment in the United States in 1940 (about 1,500,000).

In 1939-40 the enactment of a new military draft law caused a drain on the supply of applicants for higher education, and the sudden introduction of tuition fees in 1940 also had a retrogressive impact. These factors, combined

[88] Enrollment figures throughout this discussion are as of the year end, i.e., 1932 enrollment means the year-end enrollment in 1932 and thus refers to the academic year 1932–33. For factual data in the subsequent discussion and for sources from which they were compiled, see appendix table IV–A–1–E.

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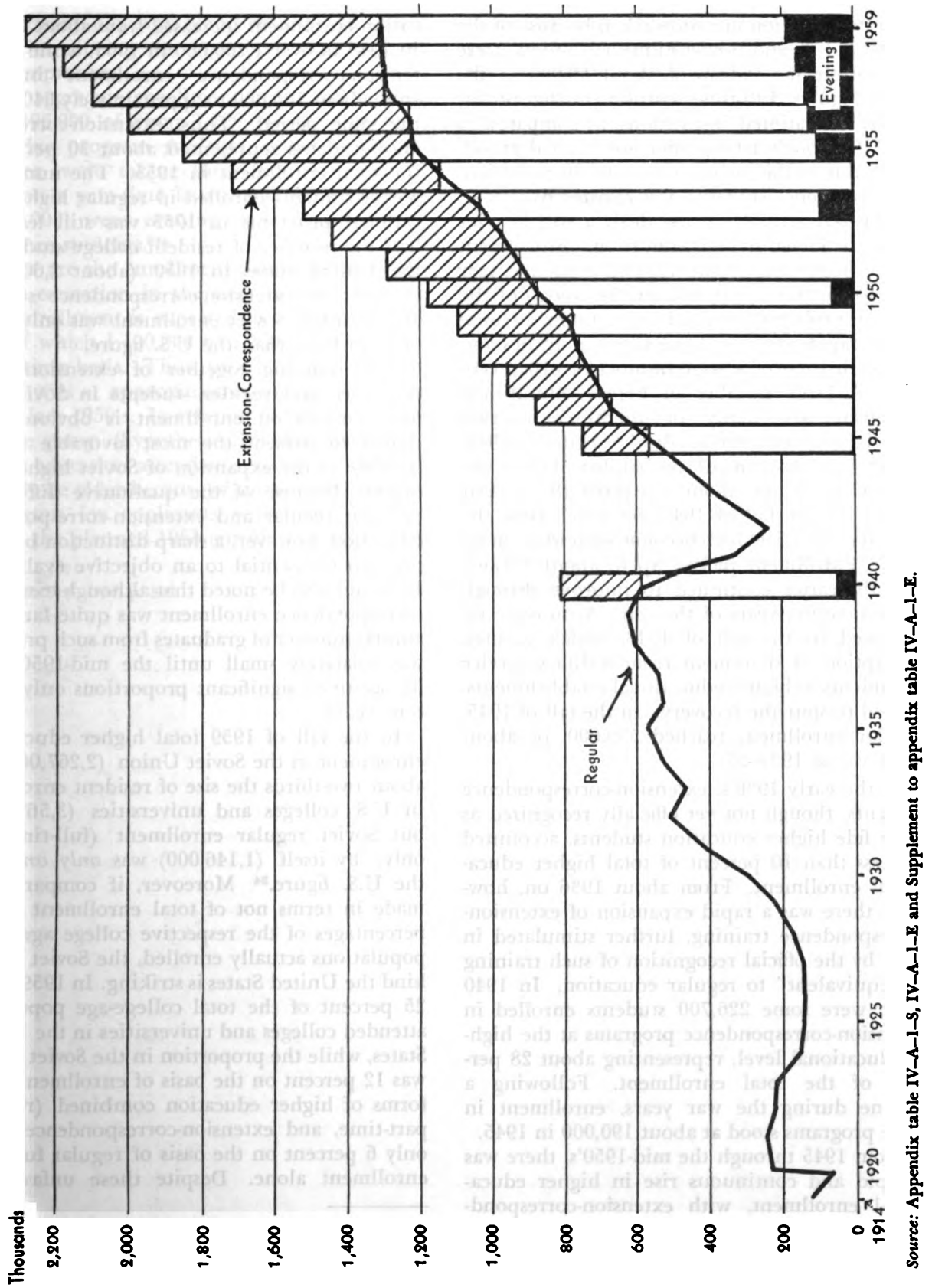
CHART XVIII.—AGGREGATE ENROLLMENT IN SOVIET HIGHER EDUCATION, 1914, 1920–59



Source: Appendix table IV–A–1–S, IV–A–1–E and Supplement to appendix table IV–A–1–E.

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with mobilization measures taken because of the Soviet-Polish and Soviet-Finnish conflicts, were responsible for a drop of about 50,000 in the 1940 regular full-time enrollment figure for higher educational institutions, as compared to 1939 (although a large increase in total enrollment, due to the inclusion of 226,700 extension-correspondence students, was registered).

The war with Germany dealt a still heavier blow to Soviet higher education. Enrollment at the beginning of the 1941-42 academic year was down to 313,000, and in the course of the year it probably dropped even lower because of the rapid advance of the German armies and the occupation of a large number of urban centers. A large number of higher educational establishments, many of them engineering schools, were evacuated. By the spring of 1942, enrollment was, in all probability, below the 200,000 mark, or about one-third the prewar figure. In the fall of 1942, by which time the military situation had become somewhat more stable, enrollment picked up to about 227,000 and thereafter continued to improve through the remaining years of the war. A measure introduced in the fall of 1943, which granted exemption or deferment from military service to students in higher educational establishments, helped to spur the recovery. In the fall of 1945, regular enrollment reached 539,000, or about the level of 1934–37.

In the early 1930's, extension-correspondence students, though not yet officially recognized as bona fide higher education students, accounted for less than 10 percent of total higher educational enrollment. From about 1936 on, however, there was a rapid expansion of extension-correspondence training, further stimulated in 1938 by the official recognition of such training as "equivalent" to regular education. In 1940 there were some 226,700 students enrolled in extension-correspondence programs at the higher educational level, representing about 28 percent of the total enrollment. Following a decline during the war years, enrollment in these programs stood at about 190,000 in 1945.

From 1945 through the mid-1950's, there was a rapid and continuous rise in higher educational enrollment, with extension-correspondence enrollment accounting for an increasing proportion of the total. Regular higher education enrollment increased from about 540,000 in 1945 to over 1,200,000 in 1955, while the extension-correspondence enrollment increased from about 190,000 to approximately 640,000 in the same period. Thus, extension-correspondence students represented about 30 percent of the total enrollment in 1955. The number of Soviet students enrolled in regular higher educational programs in 1955 was still less than half the number of resident college students in the United States in 1950 (about 2,600,000); however, if extension-correspondence students are included, Soviet enrollment was only about one-third less than the U.S. figure.

The lumping together of extension-correspondence and regular students in Soviet pronouncements on enrollment is obviously designed to present the most favorable picture possible of the expansion of Soviet higher education. Because of the qualitative differences between regular and extension-correspondence education, however, a sharp distinction between the two is essential to an objective evaluation. It should also be noted that although extension-correspondence enrollment was quite large, the annual number of graduates from such programs was relatively small until the mid-1950's and has assumed significant proportions only in recent years.

In the fall of 1959 total higher educational enrollment in the Soviet Union (2,267,000) was about two-thirds the size of resident enrollment in U.S. colleges and universities (3,567,000), but Soviet regular enrollment (full-time day only) by itself (1,146,000) was *only one-third* the U.S. figure.[84] Moreover, if comparison is made in terms not of total enrollment but of percentages of the respective college age-group populations actually enrolled, the Soviet lag behind the United States is striking. In 1959 about 25 percent of the total college-age population attended colleges and universities in the United States, while the proportion in the Soviet Union was 12 percent on the basis of enrollment in all forms of higher education combined (regular, part-time, and extension-correspondence), and only 6 percent on the basis of regular full-time enrollment alone. Despite these unfavorable

[84] U.S. figures from National Science Foundation, *Statistical Handbook of Science Education*, Washington, D.C.: U.S. Government Printing Office, 1960, p. 6.

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comparisons, however, Soviet advances in higher education during the last three decades have been impressive.

The aggregate enrollment in the fall of 1960 was 2,396,000, of whom 1,156,000, or 48 percent, were day program students (some of whom, however, were taking their first two years of study on a part-time basis), and the remainder (1,240,000) were evening or extension-correspondence students.[84a]

What are the enrollment prospects for Soviet higher education in the near future? In 1965 total enrollment is expected to be about 3,000,000, of which 1,100,000 to 1,300,000 will be on a full-time basis. Thus, projected full-time enrollment is at approximately the same level as in the late 1950's. In relation to the 18–23-year-old age group (hypothetically corresponding to higher education attendance, though many will actually be older because of the newly instituted preference for applicants with prior employment), the planned 1965 enrollment in all types of higher education will constitute about 20 percent of the college-age population, and in regular full-time programs only, about 6.7 percent. U.S. enrollment in 1965 will be about 4,000,000 resident students, or about one and a quarter times the total Soviet enrollment, and almost four times the enrollment in full-time programs alone.

[84a] *SSSR-Tsif–1960*, p. 308.

2. *Enrollment by Branch*

During the last 30 years, marked shifts have occurred in the composition of Soviet higher educational enrollment by field of specialization. Table IV–36 shows distribution by branch of study for selected years, and appendix table IV–A–1–E provides enrollment figures (by branch where available) for all years from 1928 through 1959. Table IV–36 shows distribution both in absolute numbers of students enrolled in individual branches and in percentages of total higher educational enrollment. The distribution by field is also presented graphically in chart XIX.

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TABLE IV–36.—*Enrollment in Soviet higher educational establishments by branch for selected years, 1928–58*

Branch		1928–29		1932–33		1940–41		1945–46		1950–51		1955–56		1958–59	
		Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent
Engineering, total	T	52.3	29.7	233.4	46.8	204.6	25.1	187.3	25.6	320.7	25.7	649.6	34.8	847.0	39.4
	R	52.3	.....	233.4	.....	176.8	.....	.....	.....	268.2	.....	497.7	.....	576.6	.....
	E	(a)	.....	(a)	.....	27.8	.....	.....	.....	52.5	.....	151.9	.....	270.4	.....
Industry and construction	T	.....	.....	187.4	37.6	168.4	20.7	158.0	21.6	272.8	21.9	550.6	29.5	.....	.....
	R	.....	.....	187.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	E	(a)	.....	(a)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Transportation and communication	T	.....	.....	46.0	12.2	36.2	4.4	29.3	4.0	47.9	3.8	99.0	5.3	.....	.....
	R	.....	.....	46.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	E	(a)	.....	(a)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Agriculture	T	26.9	15.2	62.2	12.5	52.1	6.4	49.8	6.8	104.1	8.3	195.9	10.5	232.0	10.8
	R	26.9	.....	62.2	.....	45.7	.....	.....	.....	89.4	.....	150.0	.....	.....	.....
	E	(a)	.....	(a)	.....	6.4	.....	.....	.....	14.7	.....	45.9	.....	.....	.....
Socioeconomic (economics and jurisprudence)	T	[a]26.3	14.9	[b]63.2	12.6	36.2	4.5	44.5	6.1	89.2	7.2	106.7	5.7	158.0	7.3
	R	[a]26.3	.....	[b]63.2	.....	22.5	.....	.....	.....	43.1	.....	47.3	.....	.....	.....
	E	(a)	.....	(a)	.....	13.7	.....	.....	.....	46.1	.....	59.4	.....	.....	.....
Education, total	T	45.5	25.7	93.5	18.7	408.9	50.5	333.0	45.6	621.9	49.9	756.0	40.5	730.0	34.0
	R	45.5	.....	93.5	.....	230.2	.....	.....	.....	336.3	.....	380.5	.....	.....	.....
	E	(a)	.....	(a)	.....	178.7	.....	.....	.....	285.6	.....	375.5	.....	.....	.....
Education	T	.....	.....	.....	.....	398.6	49.2	321.9	44.5	607.0	48.8	741.6	39.7	715.0	33.2
	R	.....	.....	.....	.....	220.7	.....	.....	.....	322.1	.....	368.0	.....	.....	.....
	E	(a)	.....	(a)	.....	177.9	.....	.....	.....	284.9	.....	373.6	.....	.....	.....
Arts	T	.....	.....	.....	.....	10.3	1.3	11.1	1.1	14.9	1.1	14.4	.8	15.0	.8
	R	.....	.....	.....	.....	9.5	.....	.....	.....	14.2	.....	12.5	.....	.....	.....
	E	(a)	.....	(a)	.....	.8	.....	.....	.....	.7	.....	1.9	.....	.....	.....
Medicine, health and physical culture	T	25.6	14.5	46.4	9.4	109.8	13.5	115.6	15.9	111.5	8.9	158.8	8.5	183.0	8.5
	R	25.6	.....	46.4	.....	109.8	.....	.....	.....	108.1	.....	152.4	.....	.....	.....
	E	(a)	.....	(a)	.....	(a)	.....	.....	.....	3.4	.....	6.4	.....	.....	.....
Total	T	176.6	100.0	498.7	100.0	811.7	100.0	730.2	100.0	1,247.4	100.0	1,867.0	100.0	2,150.0[c]	100.0
	R	176.6	.....	498.7	.....	585.0	.....	539.2	.....	845.1	.....	1,227.9	.....	(c)	.....
	E	(a)	.....	(a)	.....	226.7	.....	191.0	.....	402.3	.....	639.1	.....	(c)	.....

T—Total. R—Regular. E—Extension-correspondence.

[a] Includes enrollment in Communist Party schools, which accounted for 9,800 in 1928.

[b] Includes enrollment in Communist Party schools, which accounted for 38,900 in 1932.

[c] This total (2,150,000) differs slightly from the official grand total (2,179,000) reported in *NarKhoz—1959*, p. 830, a year later. Adjustment was not made. The official grand total is composed of 1,333,000 regular (day and evening) and 846,000 extension-correspondence students.

[a] None.

Source: Appendix table IV—A—1—E, where additional data are presented for intermediate years.

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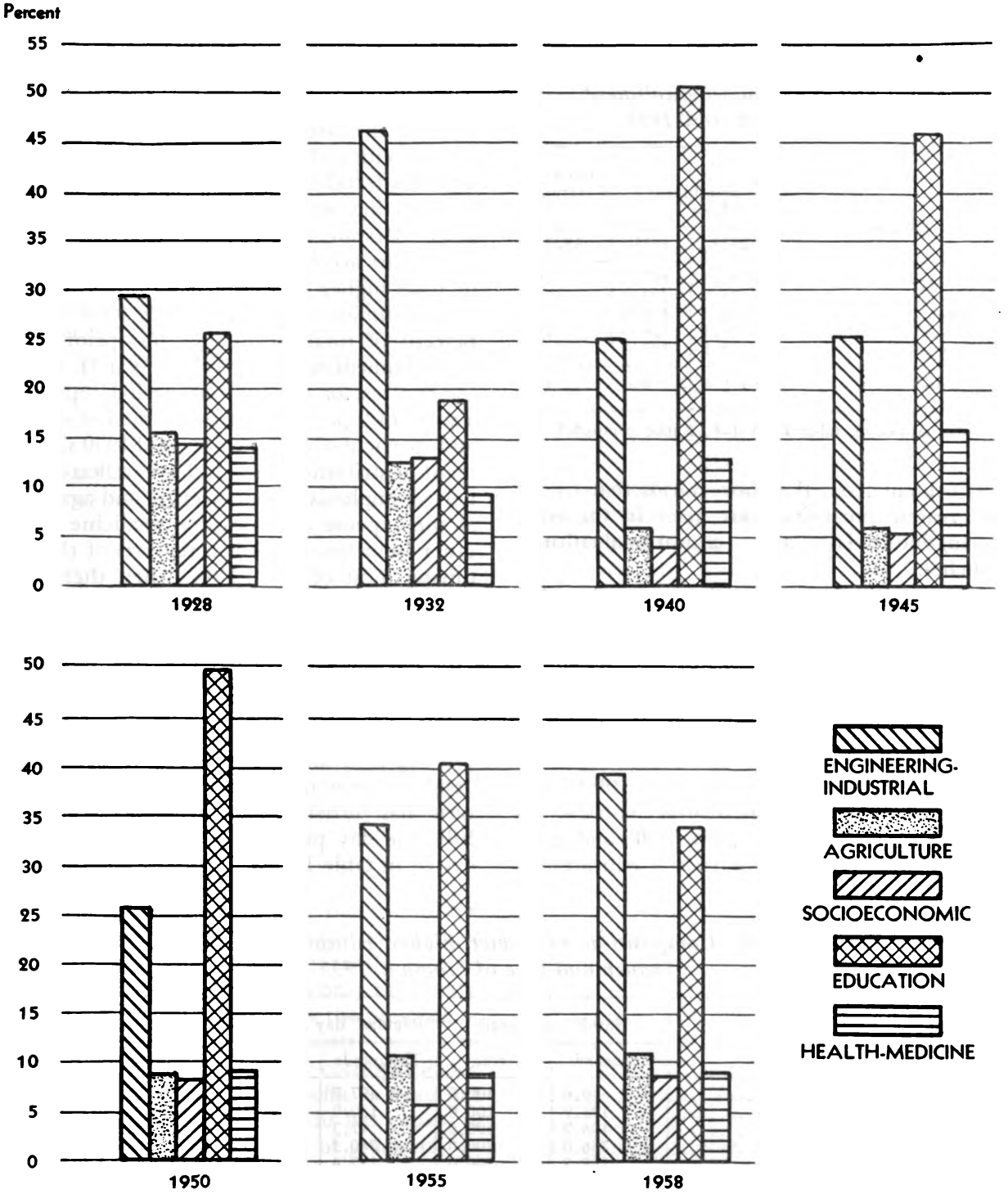
CHART XIX.—DISTRIBUTION OF HIGHER EDUCATION ENROLLMENT BY FIELD FOR SELECTED YEARS, 1928–58



Source: Appendix table IV–A–1–E.

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Comparative growth trends of enrollments in the various individual branches of higher education for the 30-year period from 1928 to 1958 are summarized in table IV–37.

TABLE IV–37.—*Comparative growth trend in Soviet higher education enrollment, by branch, 1928 and 1958*

Branch	Enrollment (thousands)		Growth ratio, 1958 to 1928
	1928	1958	
Engineering-industrial	52.3	847.0	16.2
Agriculture	26.9	232.0	8.6
Socioeconomic	26.3	158.0	6.0
Educational-cultural	45.5	730.0	16.0
Health-medical	25.6	183.0	7.1
Total	176.6	2,150.0	12.2

Source: Appendix table IV–A–1–E. Ratios computed.

It is evident from the above ratios that by far the greatest expansion took place in the engineering-industrial and educational-cultural branches.

As indicated by the data in appendix table IV–A–1–E, summarized in table IV–36, the growth of enrollment by branch was uneven. There was a threefold expansion of total enrollment in the early 1930's, followed by a brief period of stagnation in the mid-1930's. The largest gains were made in the period of recovery from World War II up until the present.

Engineering and agricultural enrollments gained significantly in the early 1930's and again in the 1950's. Enrollment in the educational-cultural branch made great gains in the late 1930's and 1940's, but remained almost stationary in the 1950's.

Engineering enrollment was dominant from the late 1920's until about 1937–38. At the peak of the expansion of engineering training in 1932, it accounted for 47 percent of total higher educational enrollment. (See chart XIX.) Toward the late 1930's enrollment in the educational-cultural branch began to predominate, and this trend continued into the postwar period, pushing engineering enrollment into second place. Despite this, engineering enrollment in most years accounted for more than 25 percent of total higher educational enrollment. Medical enrollment regained its 1928 level of 14–16 percent of total enrollment just prior to and again immediately after World War II, but during the rest of the 1928–58 period represented a share of 9 percent or less. In the last ten years and particularly since the mid-1950's, enrollment distribution trends have reflected a renewed emphasis on engineering and agriculture at the expense of education, medicine and the other branches. This is a reversal of the trend during most of the 1930's, when there was a gradual decline in the proportion of engineering and agriculture students.

The latest year for which figures are available showing enrollment by branch and also by type of program—"regular" and extension-correspondence—is 1955. (It should be noted that evening programs are included here in the category of "regular" programs, though the latter term has hitherto been used to refer only to full-time day programs.) These data are presented in table IV–38.

TABLE IV–38.—*Composition of Soviet higher education enrollment by branch and type of program, 1955*

Branch	Enrollment (total)		"Regular" day and evening		Extension-correspondence	
	Thousands	Percent	Thousands	Percent	Thousands	Percent
Engineering-industrial	649.6	100.0	497.7	76.6	151.9	23.4
Agriculture	195.9	100.0	150.0	76.5	45.9	23.5
Socioeconomic	106.7	100.0	47.3	44.2	59.4	55.8
Educational-cultural	756.0	100.0	380.5	50.3	375.5	49.7
Health-medical	158.8	100.0	152.4	95.7	6.4	4.3
Total	1,867.0	100.0	1,227.9	65.8	639.1	34.2

Source: Appendix table IV–A–1–E.

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The proportion of extension-correspondence students was obviously heaviest in the socio-economic and educational-cultural branches—approximately 56 and 50 percent respectively—as compared to less than 25 percent in engineering and agriculture. The rapid expansion of part-time education in the late 1950's has undoubtedly increased the proportion of extension-correspondence students in all fields since 1955.

Of total enrollment in extension-correspondence programs, by far the largest proportion was concentrated in the education branch up to 1950. By 1955, however, because of the expansion of extension-correspondence programs in other fields, the percentage of extension-correspondence students in education declined, as indicated in table IV–39, although it still accounted for the largest proportion—58.8 percent.

TABLE IV–39.—*Distribution of extension-correspondence students by branch, 1950–51 and 1955–56*

[In percent]

Branch	1950–51	1955–56
Engineering	13.1	23.8
Agricultural	3.8	7.2
Socioeconomic	9.5	9.3
Educational-cultural	70.0	58.8
Health	None	.9
Unaccounted	3.6	.....
Total	100.0	100.0
Enrollment (in thousands)	402.3	639.1

Source: *BSE–2d*, vol. 16, 1953, p. 422; appendix table IV–A–1–E.

This shift in distribution and the overall increase in extension-correspondence enrollment in all fields of study have significantly affected the flow of graduates. Whereas only the education field was heavily affected by the presence of extension-correspondence students prior to 1950, the expansion of extension-correspondence enrollment as a whole, but chiefly in branches other than education, since 1950 has caused a significant increase in the flow of graduates in these other branches.

The former preponderant concentration of extension-correspondence students in the educational-cultural branch was largely the result of measures taken by the Soviet Government in 1936 and again during the war (1942–44), whereby primary and secondary-school teaching positions were graded according to the level of educational preparation required, and wage differentials instituted on the basis of these levels. Intermediate and upper secondary grade teachers were required to have higher education, and those who had not completed it were obliged to do so through extension-correspondence training. These measures were responsible for the sharp expansion of extension-correspondence enrollment specifically in the education field in the late 1930's and most of the 1940's.

The extremely rapid expansion of extension-correspondence training in all fields, which is still going on, also resulted in part from the inability—and unwillingness—of regular higher educational establishments to accommodate the growing number of 10-year school graduates aspiring to professional training. Unable to gain admission to higher education, increasing numbers of these graduates were obliged to go directly into industrial and agricultural employment; and the Soviet Government sought to offset this by allowing them to enroll in part-time extension-correspondence programs. The economic and sociopolitical reasons impelling the regime to deliberately channel secondary school graduates into active employment rather than permit them to enter full-time higher educational institutions have already been discussed.

There is insufficient information to permit a reliable determination of the proportions of part-time students (both evening and extension-correspondence) in each of the several branches of specialization for the late 1950's. However, table IV–40 presents such data for selected years up to 1958 in the engineering-industrial branch. The figures indicate a more than five-fold increase of enrollment in extension-correspondence programs from 1950 (52,300) to 1958 (270,400), and a sevenfold increase in evening program enrollment during the same period. It must be kept in mind that, of the total enrollment in all evening programs, almost three-fourths was in the engineering-industrial branch. In 1958, out of a total of 153,300 evening students in all fields, engineering ac-

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counted for 116,700, or 72.2 percent.[35] As a result of the 1950–58 increases in evening and extension-correspondence enrollments, these two combined accounted for almost 46 percent of total enrollment in engineering programs of all types in 1958. This will, of course, have an important effect on the make-up of the annual contingents of engineering graduates in the early 1960's.

Before 1955, graduates from part-time programs not only in engineering but also agriculture and medicine constituted less than 5 percent of the total annual graduates in the respective fields. In the 1960's, however, a greatly increased proportion of engineering graduates will be coming from part-time programs. The proportion of engineering graduates from extension-correspondence programs in 1959 was about 15 percent, and this proportion will increase substantially on the basis of the 31.9 percent proportion of extension-correspondence students in total 1958 engineering enrollment. The same trend will also make itself felt, in varying degrees, in the makeup of graduating contingents in the other fields of specialization.

[35] *Eliutin-VSSS–1959*, p. 34. Education specialties accounted for the majority of all extension-correspondence students for many years; and engineering-industrial students for the majority of all evening students.

3. *Total Graduations and Distribution by Type of Program*

Appendix table IV–A–1–G provides data on total annual numbers of graduates from all types of Soviet higher educational establishments during the last three decades (1928–60). Chart XX depicts graphically the growth of graduating classes from Soviet higher educational establishments subdivided into evening, "regular" (full-time day) and extension-correspondence programs. From a level of less than 30,000 in 1928, annual graduations tripled during the 1930's to about 100,000 on the eve of World War II. In 1940, in addition to graduates from regular programs, there were 24,000 graduates (almost exclusively teachers) from the then recently recognized extension-correspondence programs. (It should be noted again that prior to the late 1930's extension-correspondence graduates were not counted, and that the relatively few evening graduates were grouped together with "regular" graduates.) After a severe drop in the flow of graduates owing to the war, the prewar level was again reached in the late 1940's. Between 1947 and 1959, annual graduations from *all* programs increased about three and a half times, reaching almost 340,000 in 1959, while graduations from extension-correspondence programs alone increased over

TABLE IV–40.—*Number and composition of engineering-industrial branch enrollment by type of program for selected years, 1940–58*

Year	Total		Day program		Evening program		Total "regular" (day and evening)		Extension-correspondence program		Actual total part-time (evening and extension-correspondence)	
	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent
1940.....	204.6	100.0	164.6	80.4	13.3	6.5	177.9	86.9	26.7	13.1	40.0	19.6
1950.....	320.7	100.0	253.6	79.1	14.8	4.6	268.4	83.7	52.3	16.3	67.1	20.9
1955.....	649.6	100.0	438.9	67.6	60.1	9.3	499.0	76.9	150.6	23.1	210.7	32.4
1957.....	770.0	100.0	447.2	58.1	96.8	12.5	544.0	70.6	226.0	29.4	322.8	41.9
1958.....	847.0	100.0	459.9	54.3	116.7	13.8	576.6	68.1	270.4	31.9	387.1	45.7

Sources and Notes: Appendix table IV–A–1–E and *Eliutin-VSSS–1959*, p. 34. There are minor differences between the figures reported in table IV–A–1–E and in the Eliutin source in regard to the number of extension-correspondence students, which results in a slightly different total for "regular" students in the table above and in appendix table IV–A–1–E, corresponding row "R."

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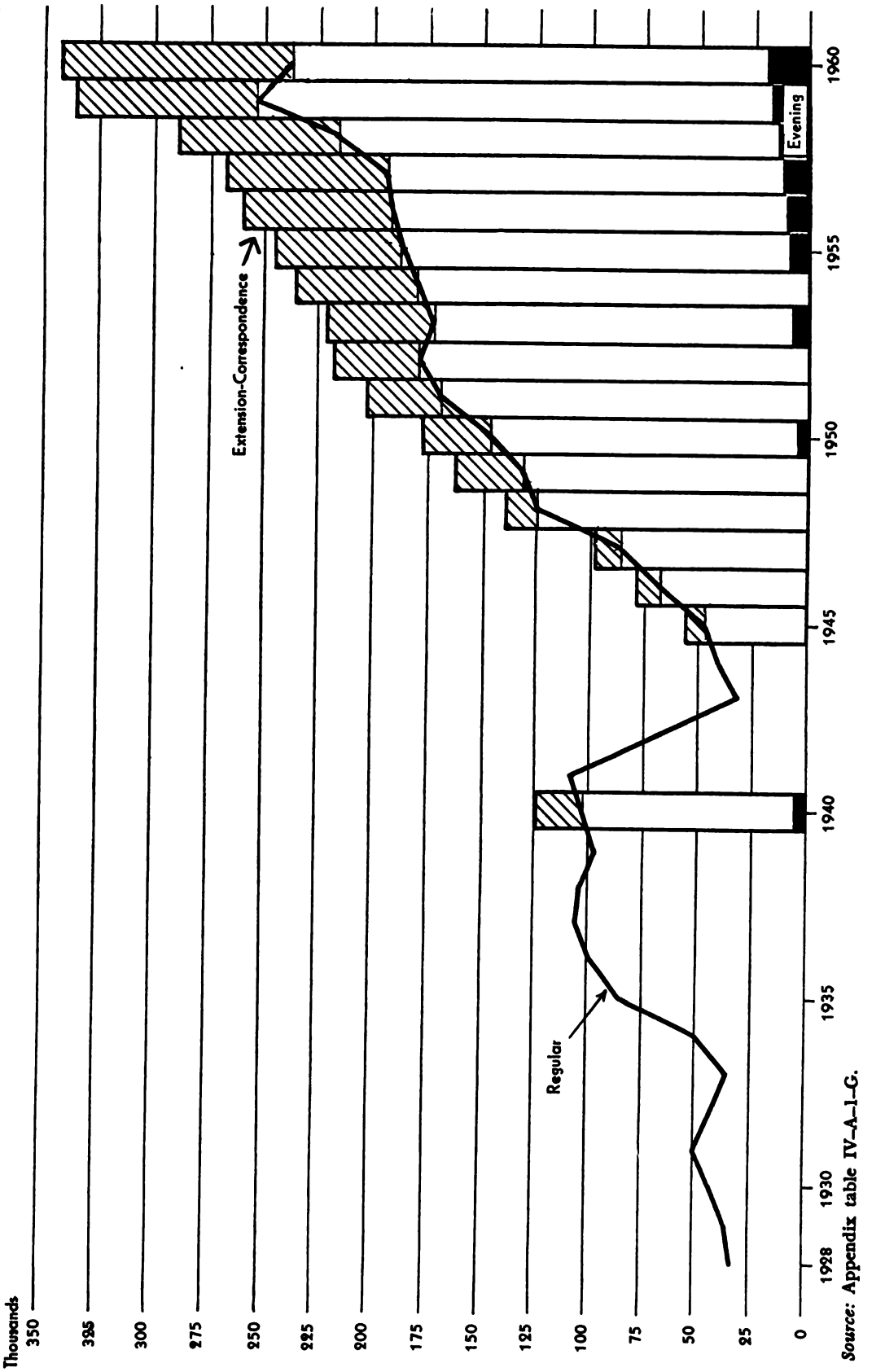
CHART XX.—GRADUATIONS FROM SOVIET HIGHER EDUCATIONAL ESTABLISHMENTS, 1928–60



Source: Appendix table IV–A–1–G.

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TABLE IV–41.—*Number and composition of graduates in all fields by type of program for selected years, 1940–60*

Year	Total		Day program		Evening program		Total "regular" (day and evening)		Extension-correspondence program		Actual total part-time (evening and extension-correspondence)	
	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent
1940.....	126.1	100.0	97.8	77.5	4.4	3.5	102.2	81.0	23.9	19.0	28.3	22.5
1950.....	176.9	100.0	145.9	82.5	2.0	1.1	147.9	83.6	29.0	16.4	31.0	17.5
1955.....	245.8	100.0	179.2	72.9	4.6	1.9	183.8	74.8	62.0	25.2	66.6	27.1
1957.....	267.0	100.0	186.8	70.0	7.2	2.8	194.0	72.8	72.5	27.2	79.7	30.0
1958.....	290.7	100.0	205.2	70.6	8.7	3.0	213.9	73.6	76.8	26.4	85.5	29.4
1959.....	338.0	100.0	240.5	71.2	13.2	3.9	253.7	75.1	84.3	24.9	97.5	28.8
1960.....	342.0	100.0	.....	.....	.....	.....	227.3	66.3	.....	.....	114.7	33.7

Sources: Appendix tables IV–A–1–S; IV–A–1–G; *Eliutin-VSSS–1959*, p. 35; *NarKhoz–1960*, p. 748; *SSSR-Tsif–1960*, p. 309.

threefold, to almost 85,000, or nearly 25 percent of the total.

The changing composition of graduating classes by type of program between 1940 and 1960 is shown by the data in table IV–41. In 1940 evening program graduates accounted for about 3.5 percent of total graduates; this proportion declined in the 1940's and early 1950's, but in 1958 again reached nearly the same proportion as in 1940. The proportion of extension-correspondence graduates rose from 19 percent in 1940 to almost 25 percent by 1959; and 28.8 percent of the total graduating class in 1959 (338,000) were from part-time programs. It was anticipated that approximately 125,000, or 36 percent, of the 1960 contingent of graduates would be from part-time programs (evening and extension-correspondence), representing an all-time high.[36] The actual number of 1960 graduations was 342,000, of whom 227,300, or 66.3 percent, were from day programs, and the remainder (114,700) from evening or extension-correspondence programs. In the early 1960's the proportion of graduates from part-time programs will undoubtedly continue to increase.

[36] Actual graduations in 1960 from part-time programs were 114,700 (*SSSR-Tsif–1960*, p. 309). As in the past, the number of full-time graduates was "overfulfilled" and of part-time graduates "underfulfilled." In 1959, for example, anticipated extension-correspondence program graduates were set at 100,000 (*VVSh*, No. 6, June 1959, p. 4), while the actual number was 84,300 (appendix table IV–A–1–S). Similarly, in 1960, anticipated graduations from part-time programs were 125,000 and the actual number, 114,700.

Like virtually every form of activity in the Soviet Union, the "production of graduates" is a subject of national planning. Trends in the planned and actual flow of higher education graduates by successive plan periods are summarized in table IV–42.

TABLE IV–42.—*Planned and actual number of higher education graduates in all fields by plan periods*

Period	Graduations	
	Planned	Actual
1st Five-Year Plan (1929–32)...	[f]149,400	[e]170,000
2d Five-Year Plan (1933–37)...	[d]336,300	[e]370,000
3d Five-Year Plan (1938–42)...	[b]602,900	.....
3 years of the 3d Five-Year Plan (1938–40).....	.....	[e]304,000
War (1941–45).....	.....	[e]286,000
4th Five-Year Plan (1946–50)...	[e]602,000	[e]652,000
5th Five-Year Plan (1951–55)...	[b]900,000	[e]1,121,000
7-year period (1952–58).....	.....	[e]1,700,000
6th Five-Year Plan (1956–60) (abandoned).....	[g]1,680,000	1,497,000
1st Seven-Year Plan (1959–65)..	[g]2,300,000	.....

Sources and Notes: Appendix table IV–A–1–G; and also:

[a] *Pravda*, Nov. 14, 1958 (directives of the Seven-Year Plan); Dec. 1, 1958.

[b] *Tretii FYP*, p. 237.

[c] *VVSh*, No. 10, Oct. 1946, p. 3.

[d] *Vtoroi FYP*, p. 336.

[e] *NKh–1956*, p. 229 (actual exact figure for 1952–58 period is 1,737,000).

[f] *Plan Kadrov–1930*, pp. 60, 274.

[g] *Pravda*, July 7, 1956.

[h] *Direktivy-SBX–1957*, vol. 3, pp. 687–88.

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It is interesting to note that the actual flow of graduates usually exceeded the "planned" or anticipated "target" figures. Such overfulfillment of planned targets may result from a combination of factors: i.e., a larger volume of admissions and higher success rates than anticipated, or an unexpected influx of students whose study had previously been interrupted by the military draft or some other cause. However, the designated target (1,680,000) for graduations under the Sixth Five-Year Plan (1956–60), which was abandoned in 1957, would not have been similarly "overfulfilled." Actual graduations in the years 1956-60 were about 1,497,000, or about 183,000 short of the originally planned goal. The Sixth Five-Year Plan was abandoned because its target goals for most sectors of the economy were obviously unattainable; however, it is significant that the target for professional graduates would not have been fulfilled either.

Table IV–43 shows how the average annual number of graduations grew, both overall and by type of program, in the successive plan periods. The data in this table are also used in Chart XXI, which provides a graphic picture of the trends. The average annual number of graduations tripled from the First to the Third Five-Year Plan, and again increased two and a half times from the Fourth Five-Year Plan to the late 1950's.

TABLE IV–43.—*Average annual graduations from Soviet higher educational establishments, by plan periods*

Period	Average per annum	Day and evening programs	Extension-correspondence programs
1st Five-Year Plan (1929–32), actual.....	42,500	42,500	None
2d Five-Year Plan (1933–37), actual.....	74,000	74,000	None
3d Five-Year Plan (1938–40), actual.....	109,400	101,400	8,000
War Years (1941–45), actual.....	60,400	57,200	3,200
4th Five-Year Plan (1946–50), actual.....	130,400	112,200	18,200
5th Five-Year Plan (1951–55), actual.....	224,300	174,900	49,400
6th Five-Year Plan (1956–60), planned....	336,000	200,000	136,000
4 years of the 6th Five-Year Plan (1956–59), actual.....	289,200	209,700	79,500
7-year period (1952–58), actual.....	248,100	186,400	61,700
1st Seven-Year Plan (1959–65), planned....	328,000	178,000	150,000

Sources: Appendix table IV–A–1–G. See the derivation of the 1956–60 projected number of graduates in appendix table IV–A–3. It should be noted that "planned" figures (i.e., those proposed by Soviet authorities as targets) are not to be confused with "projected" figures (i.e., estimates of graduates derived in this study on the basis of *actual* enrollment and first-year acceptance figures).

It is also useful to compare the planned average annual flow of graduates under the current Seven-Year Plan (1959–65) with the projected and actual graduation rates in the 1950's. The data presented in table IV–43 [37] indicate that the Seven-Year Plan targets for higher education call for an average overall graduation rate of 328,000 yearly from all programs, which is slightly lower than the projected 336,000 annual average originally called for by the shortlived Sixth Five-Year Plan; and also that the projected average annual flow of graduates from "regular" (day and evening) programs under the current plan (178,000) is *substantially lower* not only than the originally planned annual rate under the Sixth Five-Year Plan, but also than the actual average rates for 1956–59 (209,700) and for the seven-year period 1952–58 (186,400). The Seven-Year Plan target rate for *regular* graduates is in fact at approximately the same level as under the Fifth Five-Year Plan (1951-55)—i.e., 174,900 per annum. In contrast to the lowered overall and regular program graduation rates envisaged by the current plan, it calls for a marked increase in the average annual flow of graduates from extension-correspondence programs. As pointed out earlier, the unexpectedly small flow of graduates from these programs was the main cause of the shortfall in the overall graduation rate under the Sixth Five-Year Plan. Whether or not the target for extension-correspondence graduations under the Seven-Year Plan can be met (except on paper by resorting to some kind of statistical manipulation) remains to be seen. Since regular (day) program admissions declined from 1953 through 1958 (increasing slightly in 1959 and 1960), the best hope of fulfilling the overall Seven-Year Plan target for higher education graduates lies in improving the "success" rate of extension-correspondence students. This could of course

[37] For actual annual figures, see appendix table IV–A–1–G.

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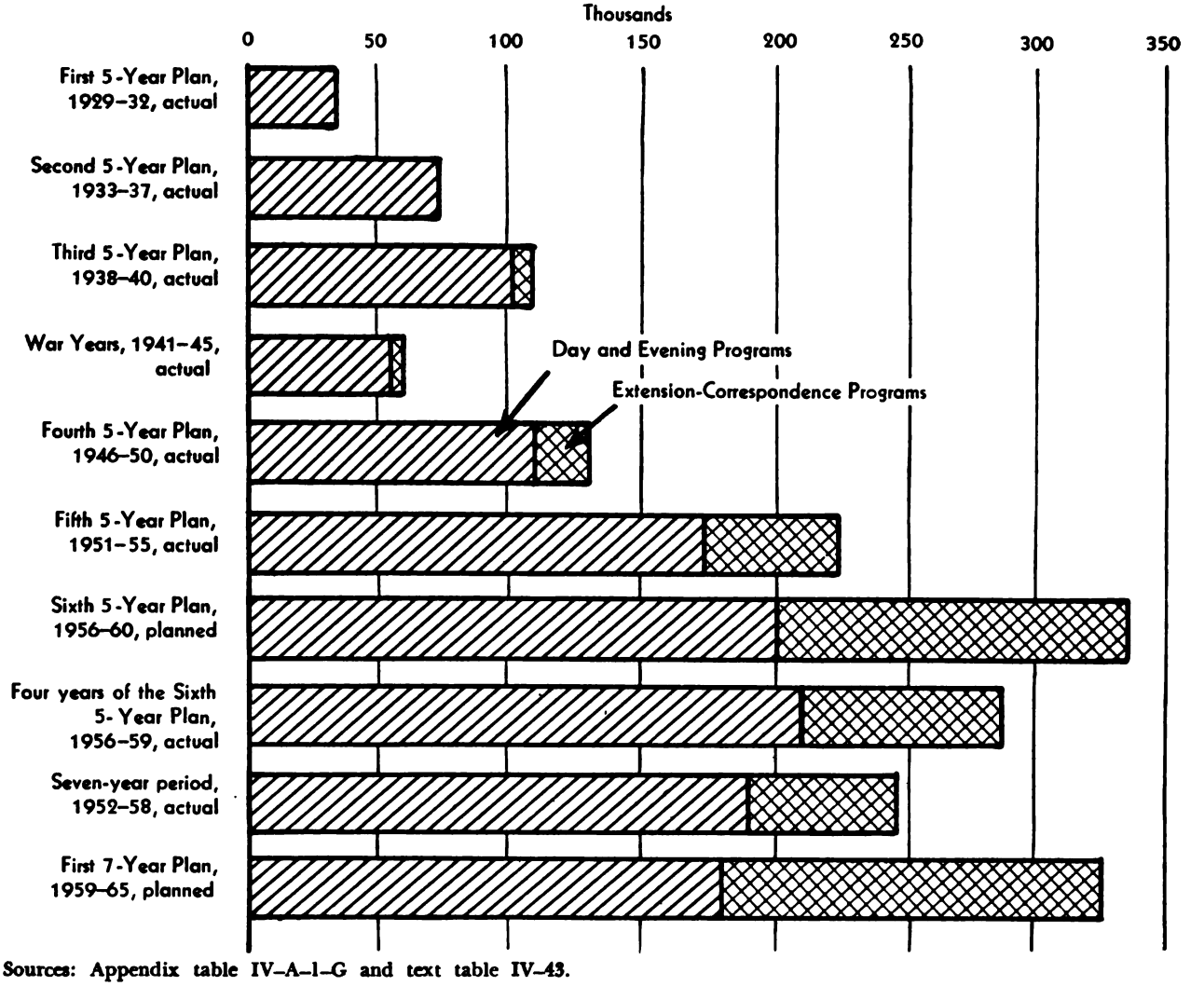
CHART XXI.—AVERAGE ANNUAL GRADUATIONS FROM SOVIET HIGHER EDUCATIONAL ESTABLISHMENTS, BY PLANNING PERIODS



Sources: Appendix table IV–A–1–G and text table IV–43.

be accomplished artificially by relaxing standards of grading, or it could be achieved through a genuine improvement in the extension-correspondence program of instruction. Efforts to effect such an improvement are underway on a wide scale at the present time.

4. *Graduation Trends by Branch*

The distribution of Soviet higher education graduates by branch reflects past trends in admissions and enrollments. When admissions and hence enrollment increase in a given branch of higher education, an increased flow of graduates in that branch develops several years later. Since Soviet higher educational programs of professional training range from 4 to 6 years in duration (and are for the most part five years), this period constitutes the lag between fluctuations in admissions and their reflection in the level of graduations. Thus, the high point of engineering program admissions in the early 1930's was reflected in the increasingly high flow of engineering graduates in the middle and late 1930's. Similarly, the periods of expansion in education and medical program enrollments in the mid 1930's were followed by corresponding increases in the flow of graduates

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in those fields just before, during and after World War II.

Table IV–44 provides data on the number and distribution of graduates from Soviet higher education by branch for selected years between 1928 and 1959 (data for intervening years may be found in appendix table IV–A–1–G). The data in table IV–44 are also shown graphically in chart XXII. During the First Five-Year Plan (1928–32), professional training was oriented primarily toward the needs of industry, with engineering students constituting up to 40 percent of total annual graduates. Engineering program graduates continued to predominate during the Second Five-Year Plan (1933–37), but during the first 4 years of the Third Five-Year Plan (1938–42), up to the outbreak of the war, the proportion of engineers fell and specialists in education began to emerge as the dominant component among graduates, reflecting the needs created by the expansion of secondary education after the mid-1930's. (See ch. II.) At the same time, the proportion of graduates from agricultural and socioeconomic programs also declined, while there was a significant increase in the proportion of medical specialist graduates. In fact, the flow of medical graduates has shown continuous expansion throughout the years, without any setbacks such as occurred in the engineering and agricultural fields.

It should be noted that the relatively small numbers of graduates from regular higher educational programs in the socioeconomic field and in agriculture were supplemented in the 1930's by graduates from Higher Communist Party schools.[38] During the period of the Second Five-Year Plan, the Higher Party schools were a fairly important source of trained specialists, contributing about 18 percent of the total output of professionals.[39] Some of their graduates obtained high administrative positions, especially in industrial and agricultural employment.

The war caused a sharp drop in overall graduations from Soviet higher educational establishments, with the lowest point reached in 1943, when the total number of graduates was about 28,000, or somewhat below the 1928 level. The output of education specialists was most severely affected, but it quickly recovered in the wake of the war and has continued to hold its prewar leading position. A comparison between the education and engineering branches reveals a considerably greater difference between the number of graduates in the two branches than between the respective enrollments. This has been due partly to the shorter duration of pedagogical training programs as compared with those for engineers (especially before the discontinuation of former 2-year training programs in teacher institutes), and probably partly to the lower "success" rate among engineering students than among students in teacher training. After a rapid postwar rise, the flow of education graduates declined somewhat in the mid-1950's, but gained again in 1959, when they totaled about 140,000. From the late 1930's until the present, education graduates have accounted for the largest proportion of total annual higher education graduates, ranging from 40 to 60 percent of the yearly total.

In the engineering field, after a rapid postwar recovery (1945—10,000; 1950—36,000), the annual flow of graduates continued to rise through the 1950's. The number of graduates reached 46,000 in 1953 and further increased to 56,000 in 1954, representing an 85 percent increase over the immediate prewar level. But the most spectacular rise has occurred since 1954. Between 1954 and 1960, the annual number of engineering graduates just about doubled, reaching about 111,100 in 1960. Throughout the remainder of the current Seven-Year Plan the Soviet Government intends to train engineers at an average rate of about 126,000 per annum, with the number rising toward the end of the period to about 135,000 in 1965.

[38] For annual graduations from these schools, see appendix table IV–A–1–G. In the table provided here, graduates of these schools during the 1930's are aggregated under the socioeconomic branch.

[39] The term "Higher Party School" refers only to the *Vysshye Partiinye Shkoly*, embracing agricultural, managerial, industrial and propaganda schools for training high-level party organizers. Party "day schools" (*dnevnye*) and lower-level party and government schools (*sovpartshkoly*) are excluded. Graduates of "Higher Party Schools" were considered to have professional training, equivalent to regular higher education, while graduates of the lower-ranking party schools were classed as having merely secondary semiprofessional training. See discussion in chapter I and in section, "Other Forms of Higher Educational Establishments," in this chapter.

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TABLE IV–44.—*Graduations from Soviet higher educational establishments by branch for selected years, 1928–59*

Branch		1928		1935		1940		1945		1950		1955		1958		1959	
		Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent
Engineering, total	T.	8.9	31.1	37.2	44.4	30.1	23.9	10.1	18.5	36.1	20.4	65.9	26.8	93.6	32.2	108.6	32.2
	R.	8.9	.....	37.2	.....	29.4	.....	9.9	.....	34.8	.....	62.2	.....	.....	.....	.....	.....
	E.	None	.....	None	.....	.7	.....	.2	.....	1.3	.....	3.7	.....	.....	.....	.....	.....
Industry and construction	T.	.....	.....	.....	.....	24.2	19.2	8.5	15.6	30.0	17.0	56.4	23.0	79.4	27.3	92.3	27.5
	R.	.....	.....	.....	.....	23.5	.....	8.3	.....	28.9	.....	53.2	.....	.....	.....	.....	.....
	E.	None	.....	None	.....	.7	.....	.2	.....	1.1	.....	3.2	.....	.....	.....	.....	.....
Transportation and communication	T.	.....	.....	.....	.....	5.9	4.7	1.6	2.9	6.1	3.4	9.5	3.8	14.2	4.9	16.3	4.7
	R.	.....	.....	.....	.....	5.9	.....	1.6	.....	5.9	.....	9.0	.....	.....	.....	.....	.....
	E.	None	.....	None	.....	Negl.	.....	Negl.	.....	.2	.....	.5	.....	.....	.....	.....	.....
Agriculture	T.	6.4	22.3	8.8	10.6	10.3	8.2	2.9	5.3	12.7	7.2	24.1	9.8	30.9	10.6	34.5	10.2
	R.	6.4	.....	8.8	.....	10.1	.....	2.9	.....	12.4	.....	23.0	.....	.....	.....	.....	.....
	E.	None	.....	None	.....	.2	.....	Negl.	.....	.3	.....	1.1	.....	.....	.....	.....	.....
Socioeconomic	T.	2.0	6.8	17.7[a]	21.1	5.7	4.5	2.4	4.4	11.4	6.4	15.6	6.4	24.0	8.3	25.0	7.4
	R.	2.0	.....	17.7	.....	4.9	.....	1.4	.....	8.6	.....	9.0	.....	.....	.....	.....	.....
	E.	None	.....	None	.....	.8	.....	1.0	.....	2.8	.....	6.6	.....	.....	.....	.....	.....
Education, total	T.	5.2	18.2	12.5	14.9	62.5	49.6	32.6	59.7	96.7	54.7	123.3	50.2	116.2	40.0	140.4	41.5
	R.	5.2	.....	12.5	.....	40.5	.....	28.5	.....	72.2	.....	73.1	.....	.....	.....	.....	.....
	E.	None	.....	None	.....	22.0	.....	4.1	.....	24.5	.....	50.2	.....	.....	.....	.....	.....
Education	T.	.....	.....	.....	.....	61.6	48.9	32.0	58.6	94.1	53.2	120.8	49.2	113.6	39.1	138.0	40.8
	R.	.....	.....	.....	.....	39.6	.....	27.9	.....	69.6	.....	70.7	.....	.....	.....	.....	.....
	E.	None	.....	None	.....	22.0	.....	4.1	.....	24.5	.....	50.1	.....	.....	.....	.....	.....
Arts	T.	.....	.....	.....	.....	.9	.7	.6	1.1	2.6	1.5	2.5	1.0	2.6	.9	2.4	.7
	R.	.....	.....	.....	.....	.9	.....	.6	.....	2.6	.....	2.4	.....	.....	.....	.....	.....
	E.	None	.....	None	.....	Negl.	.....	None	.....	Negl.	.....	.1	.....	.....	.....	.....	.....
Medicine, health and physical culture	T.	6.2	21.6	7.5	9.0	17.4	13.8	6.6	12.1	20.0	11.3	16.8	6.8	26.0	8.9	29.5	8.7
	R.	6.2	.....	7.5	.....	17.4	.....	6.6	.....	19.9	.....	16.2	.....	.....	.....	.....	.....
	E.	None	.....	None	.....	None	.....	None	.....	.1	.....	.6	.....	.....	.....	.....	.....
Total	T.	28.7	100.0	83.7	100.0	126.0	100.0	54.6	100.0	176.9	100.0	245.7	100.0	290.7	100.0	338.0	100.0
	R.	28.7	.....	83.7	.....	102.3	.....	49.3	.....	147.9	.....	183.5	.....	213.3	.....	.....	.....
	E.	None	.....	None	.....	23.7	.....	5.3	.....	29.0	.....	62.2	.....	76.7	.....	.....	.....

T—Total. R—Regular. E—Extension-correspondence.
[a] Graduates of Party schools (12,700) are aggregated within the socioeconomic branch.
Source: Appendix table IV–A–1–G.

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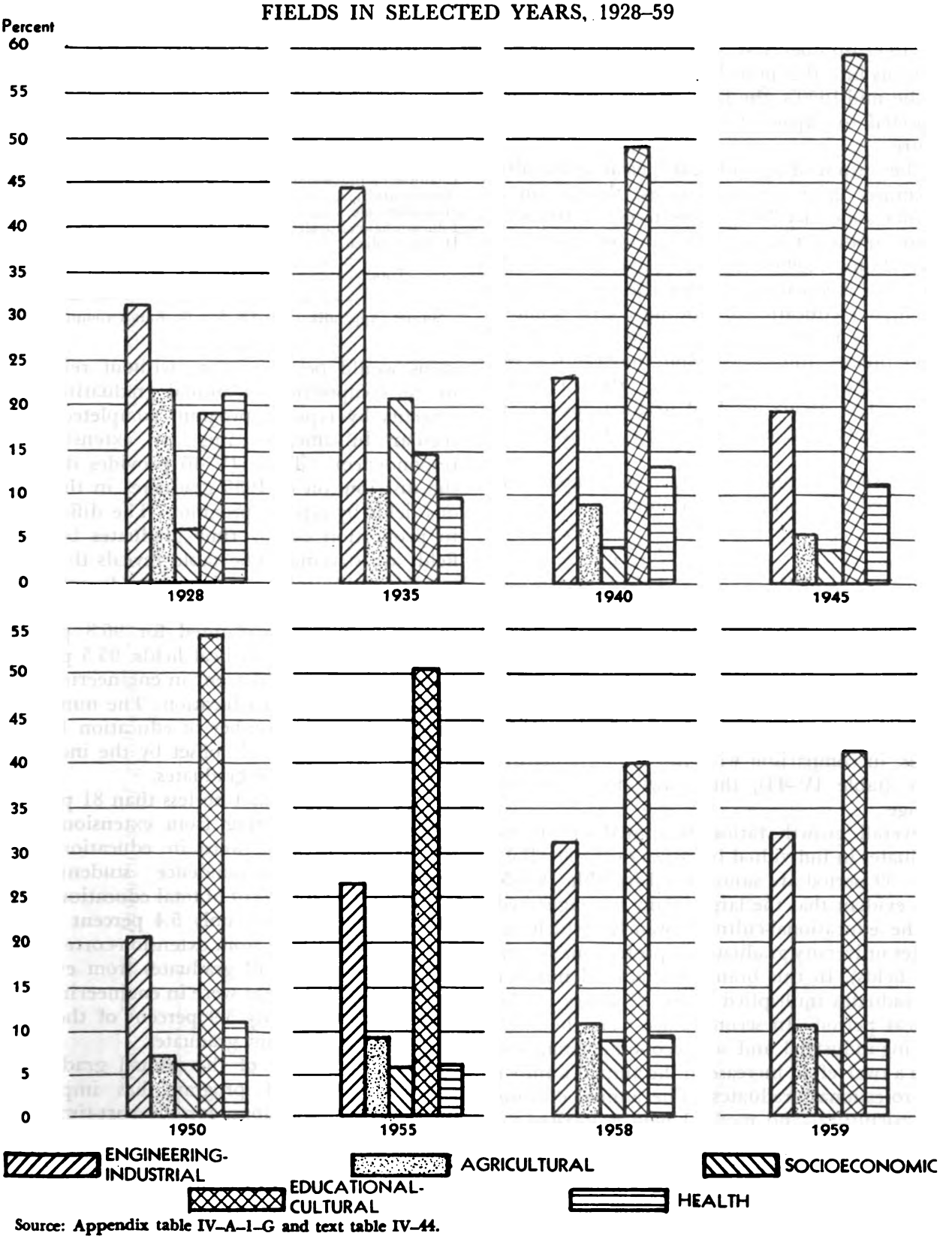
CHART XXII.—COMPOSITION OF HIGHER EDUCATION GRADUATING CLASSES BY FIELDS IN SELECTED YEARS, 1928–59



Source: Appendix table IV–A–1–G and text table IV–44.

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Annual graduations in the socioeconomic field approximately tripled from 1940 to 1955 and the 1959 number was about 25,000. Since admissions into this branch advanced very rapidly in the mid-1950's, the flow of graduates can be expected to expand further in the immediate future.

The output of agricultural specialists has also expanded in the postwar years, though on a smaller scale. By 1955, there were 2.5 times as many graduates in this field as in 1940. In 1959 about 35,000 were graduated in this field.

In the medical field, after the extension of the higher educational training course from 5 to 6 years in the late 1940's, the annual flow of graduates diminished, and in 1954 was on roughly the same level as in 1940 (about 17,000). In the late 1950's medical graduations began to increase again, with about 30,000 graduating in 1959.

The 1960 graduating class, in its composition by specialty branch, was as follows: [39a]

Specialty branch	*Thousands*	*Distribution in percent*
Engineering, total	111.1	32.4
Industry and construction	95.0	27.8
Transportation and communication	16.1	4.6
Agriculture	34.7	10.2
Socioeconomic	24.7	7.2
Education, total	141.5	41.4
Education	139.1	40.7
Arts	2.4	.7
Medicine, health and physical culture	30.0	8.8
Total	342.0	100.0

Thus, in comparison with the 1959 graduating class (table IV–44), there was no significant change.

Overall growth ratios in annual output of graduates in individual branches over the whole 1928–59 period are summarized in table IV–45. It is evident that the largest gain was registered in the educational-cultural branch (which includes university graduates in professional scientific fields). In this branch the annual number of graduates multiplied about 27 times in the 30-year period. In second place were the engineering-industrial and socioeconomic branches, with a twelvefold increase in the annual number of professional graduates. The annual outputs of agricultural and medical field graduates increased only about fivefold.

Discussion of these impressive numerical gains would be incomplete without reference to the composition of annual graduating contingents by type of program completed (i.e., regular fulltime, evening, or extension-correspondence). Table IV–46 provides data on the distribution of 1955 graduates in the various fields by type of program. The differences in proportion of part-time graduates between fields are striking. The table reveals that 72.9 percent of the total number of graduates in all fields were full-time day-program students. Such full-time students accounted for 96.8 percent of the graduates in medical fields, 95.5 percent in agriculture, 90.7 percent in engineering, but only 57.5 percent in education. The numerical gain in the total number of education branch graduates is thus partly offset by the inclusion of so many part-time graduates.

The table shows that no less than 81 percent of all those graduating from extension-correspondence programs were in education, and that extension-correspondence students accounted for 41.5 percent of total education graduates. In engineering, only 5.4 percent of the total graduates were from extension-correspondence programs. Of all graduates from evening programs, 55.8 percent were in engineering, but they represented only 3.9 percent of the total number of engineering graduates.

The composition of the annual graduating classes by type of program has important qualitative implications, for the part-time programs, i.e., evening and extension-correspondence, even though officially rated as "equivalent" to regular full-time programs, do not turn out graduates of really equivalent caliber. Hitherto,

TABLE IV–45.—*Comparative growth trend in graduations from Soviet higher educational establishments, by branch, 1928 and 1959*

Branch	Graduations (thousands)		Ratio 1959 to 1928
	1928	1959	
Engineering-industrial	8.9	108.6	12.1
Agricultural	6.4	34.5	5.4
Socioeconomic	2.0	25.0	12.5
Educational-cultural	5.2	140.4	27.0
Health-medical	6.2	29.5	4.8
Total	28.7	338.0	11.8

Source: Appendix table IV–A–1–G. Ratios computed.

[39a] *SSSR-Tsif–1960*, p. 309.

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TABLE IV–46.—*Distribution of graduations from Soviet higher educational establishments, by branch and type of program, 1955*

Branch		Total		Day		Evening		"Regular" total day and evening		Extension-correspondence		Actual total part-time	
		Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent
Engineering, total	Thousands	65.9	26.8	59.8	33.4	2.6	55.8	62.3	33.8	3.6	5.8	6.2	9.3
	Percent	(100.0)	.....	(90.7)	.....	(3.9)	.....	(94.6)	.....	(5.4)	.....	(9.3)	.....
Industry and construction	Thousands	56.4	23.0	51.0	28.5	2.2	48.6	53.2	28.9	3.2	5.2	5.4	8.1
	Percent	(100.0)	.....	(90.4)	.....	(3.9)	.....	(94.3)	.....	(5.7)	.....	(9.6)	.....
Transportation and communication	Thousands	9.5	3.8	8.8	4.9	.4	7.2	9.1	4.9	.4	.6	.8	1.2
	Percent	(100.0)	.....	(92.6)	.....	(3.5)	.....	(96.1)	.....	(3.9)	.....	(7.4)	.....
Agriculture	Thousands	24.1	9.8	23.1	12.8	Negl.	1.0	23.1	12.6	1.1	1.7	1.1	1.6
	Percent	(100.0)	.....	(95.5)	.....	Negl.	.....	(95.5)	.....	(4.5)	.....	(4.5)	.....
Socioeconomic	Thousands	15.6	6.4	8.4	4.7	.7	15.0	9.1	5.0	6.5	10.5	7.2	10.8
	Percent	(100.0)	.....	(53.8)	.....	(4.4)	.....	(58.2)	.....	(41.8)	.....	(46.2)	.....
Education, total	Thousands	123.3	50.2	71.8	40.0	1.3	28.2	73.1	39.7	50.3	81.1	51.6	77.6
	Percent	(100.0)	.....	(58.2)	.....	(1.0)	.....	(59.2)	.....	(40.8)	.....	(41.8)	.....
Education	Thousands	120.8	49.2	69.4	38.7	1.3	27.5	70.7	38.4	50.1	80.9	51.4	77.1
	Percent	(100.0)	.....	(57.5)	.....	(1.0)	.....	(58.5)	.....	(41.5)	.....	(42.5)	.....
Arts	Thousands	2.5	1.0	2.4	1.3	Negl.	.7	2.4	1.3	0.1	.2	.1	.5
	Percent	(100.0)	.....	(93.5)	.....	(1.3)	.....	(94.8)	.....	(5.2)	.....	(6.5)	.....
Medicine, health and physical culture	Thousands	16.8	6.8	16.3	9.1	None	.....	16.3	8.9	.5	.9	.5	.7
	Percent	(100.0)	.....	(96.8)	.....	.....	.....	(96.8)	.....	(3.2)	.....	(3.2)	.....
Total	Thousands	245.8	100.0	179.3	100.0	4.6	100.0	183.9	100.0	62.0	100.0	66.6	100.0
	Percent	(100.0)	.....	(72.9)	.....	(1.9)	.....	(74.8)	.....	(25.2)	.....	(27.1)	.....

Source: *KS–1956,* pp. 214–15.

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the bulk of these somewhat inferior part-time graduates have gone into the pedagogical profession (i.e., training or retraining teachers for primary and secondary schools). However, current trends suggest that increasing proportions of part-time program graduates (mostly extension-correspondence) will be entering other professional fields as well, with a possibly detrimental effect on the qualitative level of Soviet professional manpower.

The trends discussed above may be broadly summarized as follows (see also summary table IV–50): Between 1938, when extension-correspondence programs were officially recognized, and 1959, Soviet higher educational establishments graduated a cumulative total of 680,400 students from their extension-correspondence programs, about one-half of whom were graduated after 1955. During the same period, graduates from "regular" (full-time day, and evening) programs numbered 3,446,400. Thus, extension-correspondence graduates constituted about one-sixth of the total (4,127,300).

The distribution of these extension-correspondence graduates by branch can be only estimated: education-cultural, 85 percent; socioeconomic, 10 percent; engineering-industrial and agricultural combined, 5 percent; medical, negligible.[40] In relation to the total number of graduates in the respective branches, the estimated proportion of extension-correspondence graduates are: education, 32 percent; socioeconomic, 20 percent; [41] and engineering and agriculture combined, 2 percent.

Thus, only the teaching profession on the primary and secondary level has so far been affected significantly by the influx of somewhat inferior graduates of extension-correspondence programs. However, if the composition of higher education admissions by type of program in recent years and current Soviet educational policies are considered indicative of future trends, then other fields of professional activity in the Soviet Union will also be affected to a larger degree than in the past by an influx of graduates from part-time higher educational programs.

As pointed out in an earlier section of this chapter (pp. 225-29), Soviet sources employ different methods of reporting acceptance, enrollment, and graduation figures. The two which concern us here are (1) by actual specialty aggregated into specialty groups and branches, and (2) by types of institutions aggregated into specialty groups and branches. Until 1957, although Soviet sources compiled educational data by specialty and specialty groups (item 1 above), only data by type of institution (item 2 above) were made public, and it was impossible to know to what extent these classifications coincided with each other, i.e., how closely the institutional grouping by branch conformed to the specialty and specialty groupings by branch. Published Soviet data most frequently still use institutional grouping and most of the discussion above of quantitative trends was based on this kind of reporting. In the author's earlier study (*SPM*), it was assumed that there was a more or less close relationship between the two forms of reporting.

Institutional grouping means, for example, that all graduates from institutes training engineers and other specialists for industry, transportation, communication and construction are combined in one category, although they include some specialists who are not engineers in the strict sense, but specialists in related fields such as industrial economics and planning. Similarly, in institutional reporting, specialists graduating in such fields as geology, medicine, economics, or jurisprudence who were trained in universities are counted in the educational-cultural branch, since all universities are assigned to this branch in the institutional grouping. In the past, estimating procedures have been devised in order to ascertain the "true" composition of graduating classes by specialty aggregated into specialty groups and branches, as compared to the institutional reporting by branch. Official Soviet data now confirm that the two types of reporting largely coincide.

Table IV–47 presents a comparison of figures on Soviet higher education graduates in 1955 classified by the two reporting methods. The data by specialty groups are the first (and so far the only) such data to appear for the postwar

[40] Although the Soviet authorities have recently been speaking of a large-scale expansion of extension-correspondence training in medicine, it would appear that even they have not yet found a convenient way of shipping cadavers by parcel post!

[41] Note that during the 1930's, the socioeconomic branch includes graduates of Communist Party schools. See Sources and Notes to appendix table IV–A–1–G.

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period. The breakdown by specialty group on the left side of the table apparently sorts out university graduates and assigns them to the appropriate specialty group. Thus, those graduating from universities in economics and jurisprudence specialties and in medical-health specialties are assigned to the appropriate specialty groups (1700, 1800, 1900). In addition, agricultural specialists who were graduated from universities are assigned to the appropriate specialty group (1500).

However, what is of greatest interest is that economics graduates from universities alone could not account for the difference between

TABLE IV–47.—*Comparison of the composition of Soviet higher education graduating class of 1955 by specialty groups and branches and institutional reporting by branch*

Specialty classification				Institutional classification		
Specialty code	Specialty group	Number	Percent	Percent	Number	Institutional branch
	Engineering industrial, total	63,776	25.93	26.81	65,911	"Engineering", total.
				22.96	56,446	Industry and construction
				3.85	9,465	Transportation and communication.
	Mining engineering, total	9,266	3.77			
0100	a. Geology and exploration of mineral deposits	3,976	1.62			
0200	b. Exploitation of mineral deposits	5,290	2.15			
0400	Metallurgy	2,656	1.08			
	Electrical and power engineering, total	10,888	4.43			
0300	a. Power engineering	4,957	2.02			
0600	b. Electrical machine building and electrical instrument construction	2,981	1.21			
0700	c. Radio engineering and communications	2,950	1.20			
0500	Machine building and instrument construction	15,736	6.40			
1200	Construction	9,440	3.84			
	Chemical and related, total	10,386	4.22			
0800	a. Chemical technology engineering	4,954	2.01			
0900	b. Timber engineering and technology of wood processing, cellulose, and paper manufacturing	1,885	.77			
1000	c. Technology of food products industry	1,878	.76			
1100	d. Technology of consumer goods industry	1,669	.68			
1600	Transportation	4,236	1.72			
	Other, total	1,168	.47			
1300	a. Geodesy and cartography	540	.22			
1400	b. Hydrology and meteorology	628	.25			
1500	Agriculture and forestry, total	24,563	9.99	9.82	24,136	Agriculture, total
	Economics and jurisprudence, total	24,264	9.87	6.36	15,645	Socioeconomic.
1700	a. Economics	16,138	6.56			
1800	b. Jurisprudence	8,126	3.31			
	Education-cultural, total	116,300	47.31	50.16	123,329	Education-cultural, total.
2000	a. University specialties	15,560	6.35	} 49.14	} 120,836	} Education.
2100	b. Specialties in pedagogical and library institutes	98,249	39.95			
2200	c. Arts	2,491	1.01	1.02	2,493	Arts.
1900	Medicine, health and physical culture	16,943	6.90	6.85	16,825	Medicine, health and physical culture.
	Total	245,846	100.00	100.00	245,846	Total

Source: *KS–1956*, pp. 214–15, 217.

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the number of graduates shown in the economics specialty group (1700) and the total number of graduates shown for the socioeconomic branch in the institutional grouping. Considering the fact that a large number (8,126) of jurisprudence graduates are counted in the socioeconomic branch in the institutional grouping, it appears that, under the specialty breakdown, economic planning specialists trained in engineering and agricultural institutes have also been assigned to economics.

Furthermore, it may be observed that the numbers of medical graduates and arts graduates are almost identical in the two distributions. The number of agricultural specialists is higher by about 5.7 percent according to the specialty grouping than it is by the institutional grouping. "Engineering" graduates by specialty groups are about 2,200 or 3.5 percent below the corresponding figure in the institutional grouping, which could conceivably be accounted for by the exclusion from the former of economics and planning specialists included in the institutional grouping figure.

TABLE IV–48.—*Comparisons of 1955 data on Soviet higher education graduates by specialty group reporting and institutional reporting*

Branch	Specialty group reporting as compared to institutional reporting
Engineering-industrial..	About 3.5 percent less in former due to exclusion of some economics specialists and other minor categories.
Agricultural.....	About 2 percent more in former due to inclusion of agricultural specialists graduated from universities (and probably a small number of agricultural machinery engineers from the engineering-industrial branch).
Socioeconomic.....	About 35 percent more in former due to inclusion of economics specialists graduated from universities, engineering and agricultural institutes, and additional university graduates in jurisprudence.
Educational-cultural...	About 6 percent less in former due to exclusion of university specialists in economics, jurisprudence, and agriculture (and also some in medicine).
Arts.....	Almost identical.
Health-medical.....	Almost identical.

Source: Table IV–47.

Comparisons of the two types of reporting are summarized in table IV–48. Apparently, the main conclusion to be drawn from this comparison is that, except for the socioeconomic branch, where the difference is due primarily to the inclusion of some university specialists in specialty group reporting, the differences resulting from the two types of reporting are minor.

Table IV–49 gives a detailed breakdown of "engineering" field graduates by specialty group reporting including both regular and extension-correspondence graduates, in 1950 and 1955. Three main observations may be made in connection with the data. The first is that the inclusion in the "engineering" category of "alien fields"—i.e., fields which in American statistical reporting would most likely be excluded from engineering, such as some fields of geology, geodesy, cartography, hydrology, meteorology, some fields in "food technology," and "consumer industries"—could account, at most, for 7 to 10 percent of the Soviet total of "engineering" graduates. This is not an entirely new finding, but confirmation of the statement advanced in our earlier study.[42] It was estimated there that anywhere from 10 to 15 percent of "engineering" graduates by Soviet definition were categories alien to engineering as understood in the United States. On the basis of the new data on Soviet graduates in recent years, we may account for about 10 to 13 percent of "alien categories" (taking economics and planning specialists into account, in addition to those mentioned above). Thus we can state that 85 to 90 percent of "engineering" graduates as given in Soviet statistical reporting, by either specialty or institutional grouping, would fall within a similar category in the United States.[43]

[42] *SPM*, esp. pp. 116–18, 224.

[43] It has been a continuing puzzle where engineers for the mechanization and electrification of agriculture were classified in the 1930's and 1940's. Analysis of the data in table IV–49 and of the specialty groupings listed in appendix IV–B–1, however, indicates that in the 1950's such specialists (i.e., operations and maintenance engineers for agriculture, and not engineers engaged in the production of agricultural machinery, who are included in the specialty group "machine building") were classified (with possibly minor exceptions) as agricultural branch graduates. Their number cannot be determined with precision, however, and no adjustment of the engineering total was made to include them. *SSSR-Tsif-1958* (p. 339) and *SSSR-Tsif-1959* (p. 213) give annual figures for engineering graduates (in tables comparing them with U. S. engineering graduates) identical to those in the institutional grouping by branch as used in the discussion

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TABLE IV–49.—*Number and distribution of Soviet engineering graduates by specialty group reporting, 1950 and 1955*

Specialty group code	Specialty groups	1950		1955		Ratio of growth 1950–55
		Number	Percent	Number	Percent	
	"Engineering" total	[a]34,284	100.0	[b]63,776	100.0	1.86
	Mining engineering (primarily)—total	3,074	9.0	9,266	14.5	[a]3.01
0100	a. Geology, geological explorations and surveying of mineral deposits	1,721	5.1	3,976	6.2	[a]2.31
0200	b. Mining operations and exploration of mineral deposits	1,353	3.9	5,290	8.3	[a]3.91
0400	Metallurgical engineering (primarily)	1,416	4.1	2,656	4.2	[a]1.88
	Electrical and power engineering (primarily)—total	5,240	15.3	10,888	17.1	[a]2.08
0300	a. Power (including electrical power)	2,380	6.9	4,957	7.8	[a]2.08
0600	b. Electrical machinery and equipment	1,433	4.2	2,981	4.7	[a]2.08
0700	c. Radio and communications	1,427	4.2	2,950	4.6	[a]2.07
0500	Mechanical engineering (primarily): machine building and equipment—total	9,101	26.5	15,736	24.7	1.73
1200	Civil engineering (primarily): "construction"—total	4,873	14.2	9,440	14.8	[a]1.94
	Chemical and related—total	6,848	20.0	10,386	16.3	1.51
0800	a. Chemical technology (proper)	2,586	7.6	4,954	7.8	[a]1.92
0900	b. Wood derivatives, pulp, paper, cellulose, etc.	727	2.1	1,885	3.0	[a]2.59
1000	c. Food technology and food processing	2,295	6.7	1,878	2.9	.82
1100	d. "Consumer industries technology" (leather, textiles and the like)	1,240	3.6	1,669	2.6	1.35
1600	Transportation—total	3,059	8.9	4,236	6.6	1.38
	Other—total	673	2.0	1,168	1.8	1.73
1300	a. Geodesy and cartography	249	.9	540	.8	1.84
1400	b. Hydrology and meteorology	379	1.1	628	1.0	1.66

[a] Larger than average increase in graduates.

[a] Differs from engineering total which is referred to in institutional breakdowns (i.e., 36,100), presumably due to the subtraction of some economists.

[b] Differs from engineering total which is referred to in institutional breakdowns (i.e., 65,900), presumably due to the subtraction of some economists.

Source: *KS–1956*, p. 217.

The second observation is that Soviet engineering graduates in the early and mid-1950's were concentrated to a remarkable degree in "traditional" fields of engineering. The Soviet effort in engineering training lies in the areas of electrical, mechanical, civil and mining engineering.[44] In the mid-1950's the emphasis on the newer, "progressive" fields of engineering, such as electronics (4 percent of the total) was still limited, though undoubtedly there is currently a shift to give more attention to these fields.

The third observation concerns differential rates of growth in various fields of engineering. The total annual number of "engineering" graduates increased about 1.8 times from 1950 to 1955. The greatest increases were specifically in engineering specialties connected with basic extracting industries (notably mining, 390 percent; geology and explorations, 230 percent); and civil engineering (construction, 194 percent). The 5-year increase in the number of electrical and power engineering graduates was about 208 percent. Increases in the number of engineers for the food industry, consumer goods (textiles, leather and the like), and transportation all show disproportionately lower rates of growth than the overall rate for engineering as a whole. This is of course a reflection of the low priorities of these fields in the Soviet economic effort, which find further reflection in the pattern of employment of engineers (see ch. VI).

Recapitulating the broad overall trends in Soviet higher professional education over the last three decades from 1928 to 1959 (see summary data in table IV–50), we find first of all that the educational-cultural branch accounted for the largest number of graduates (1,825,800, or 44.3 percent of the total). This was followed by engineering graduates (1,120,400, or 27.2

[44] See table VI–61 in ch. VI for the aggregate number of engineers by specialty group employed in the Soviet economy in 1959.

above and in appendix table IV-A-1-G. *SSSR-Tsif-1960* (p. 314), however, gives a series of figures for engineering graduates consistently higher, presumably because the latter include engineers on the mechanization and electrification of agriculture. If this is the case, about 9,000 such engineers were graduated in 1960.

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TABLE IV–50.—*Summary of graduations from Soviet higher educational*

[in thousands

Field		1928		1st Five-Year Plan 1929–32			2d Five-Year Plan 1933–37			3d Five-Year Plan 1938–40			War years 1941–45		
		Total	Percent	Total	Per annum	Percent	Total	Per annum	Percent	Total	Per annum	Percent	Total	Per annum	Percent
1. Engineering-industrial	T.	8.9	31.1	67.7	16.92	39.8	134.4	26.88	36.3	89.8	29.93	27.4	70.8	14.16	23.4
a. Industry and construction	T.	.....	.....	.....	.....	.....	107.4	21.48	29.0	72.0	24.00	22.0	54.2	10.84	17.9
b. Transportation and communication	T.	.....	.....	.....	.....	.....	27.0	5.40	7.3	17.8	5.93	5.4	16.6	3.32	5.5
2. Agriculture	T.	6.4	22.3	30.6	7.65	18.0	41.6	8.32	11.2	31.2	10.40	9.5	21.7	4.34	7.2
3. Socioeconomic	T.	2.0	6.8	17.9	4.47	10.5	[a]73.6	14.72	19.9	[a]23.2	7.73	7.1	12.1	2.42	4.0
4. Educational-cultural	T.	5.2	18.2	34.6	8.65	20.4	84.2	16.80	22.8	140.0	46.66	42.6	135.0	27.00	44.7
a. Education	T.	.....	.....	.....	.....	.....	.....	.....	.....	137.4	45.80	41.8	131.4	26.28	43.5
b. Arts	T.	.....	.....	.....	.....	.....	.....	.....	.....	2.6	.86	.4	3.6	.72	1.2
5. Health-medical	T.	6.2	21.6	19.2	4.80	11.3	36.1	7.22	9.8	4.0	14.60	13.4	62.4	12.48	20.7
Grand total	T.	28.7	100.0	170.0	42.50	100.0	369.9	63.50	100.0	328.2	107.50	100.0	302.0	60.40	100.0
	R.	28.7	100.0	170.0	42.50	100.0	369.9	63.50	100.0	304.3	99.53	92.7	286.0	57.20	94.7
	E.	None	.....	None	.....	.....	None	.....	.....	23.9	7.97	7.3	16.0	3.20	5.3

[a] Includes Higher Communist Party school graduates during the mid-1930's.
[b] Note that 1959 actual graduates are counted in 1956-59 total; however, the 1959–65 projection also includes the 1959 graduates.
Sources: Appendix tables IV–A–1–G and IV–A–4.

T—Total
R—Regular
E—Extension-Correspondence

percent); medical graduates (464,700, or 11.3 percent); agricultural graduates (389,700, or 9.3 percent); and socioeconomic (326,700, or 7.9 percent—including Communist Party school graduates in the 1930's).

Chart XXIII, which shows graphically the average annual number of graduates in each specialty branch during the successive plan periods, clearly illustrates the dominance of two branches of professional training—education and engineering. Table IV–50 and chart XXIII also show the projected average annual number of graduates by field of study under the current Seven-Year Plan (1959–65), based on officially announced Soviet data. (For more complete details, see appendix table IV–A–4.) It is evi-

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establishments by branch and period, 1928–59 and 1959–65 projection.
and percent]

4th Five-Year Plan 1946–50			5th Five-Year Plan 1951–55			6th Five-Year Plan 1956–59[b]			1928–55	1928–59		1959–65 projection[b]		
Total	Per annum	Percent	Total	Per annum	Percent	Total	Per annum	Percent	Total	Total	Percent	Total	Per annum	Percent
134.1	26.82	20.6	258.7	51.74	23.1	356.0	89.00	30.9	764.4	1,120.4	27.2	880.0	126.00	37.6
112.9	22.58	17.3	219.0	43.80	19.5	.....	.....	.....	642.1	.....	.....	.....	.....	.....
21.2	4.24	3.3	39.7	7.94	3.6	.....	.....	.....	122.3	.....	.....	.....	.....	.....
45.3	9.06	6.9	91.5	18.30	8.2	121.4	30.30	10.5	268.3	389.7	9.3	246.0	35.00	10.4
38.8	7.76	6.0	71.2	14.24	6.3	88.1	22.00	7.6	[a]238.8	[a]326.7	7.9	247.0	35.00	10.4
324.7	64.94	49.8	612.2	122.44	54.6	489.9	122.50	42.4	1,335.9	1,825.8	44.3	776.0	111.00	33.2
316.1	63.22	48.5	599.4	119.88	53.4	.....	.....	.....	1,308.3	.....	.....	.....	.....	.....
8.6	1.72	1.3	12.8	2.56	1.2	.....	.....	.....	27.6	.....	.....	.....	.....	.....
109.1	21.82	16.7	87.8	17.56	7.8	99.9	25.00	8.6	364.8	464.7	11.3	196.0	28.00	8.4
652.0	130.40	100.0	1,121.4	224.28	100.0	1,155.1	288.80	100.0	2,972.2	4,127.3	100.0	2,345.0	335.00	100.0
561.0	112.20	86.0	874.4	174.88	77.9	852.5	213.10	73.9	2,594.4	3,446.9	83.5	.....	.....	.....
91.0	18.20	14.0	247.0	49.40	22.1	302.6	75.70	27.1	377.8	680.4	16.5	.....	.....	.....

dent from these projections that while the educational-cultural branch will continue to be emphasized, the absolute annual number of graduates from such programs will decline somewhat. The annual flow of graduates in engineering, agricultural and socioeconomic branches of professional training will all increase, and in the early 1960's engineering graduates will become the major component, with an average flow of about 126,000 graduates per annum. In 1965, of the total projected graduating class of 350,000, 135,000 are expected to be engineers.

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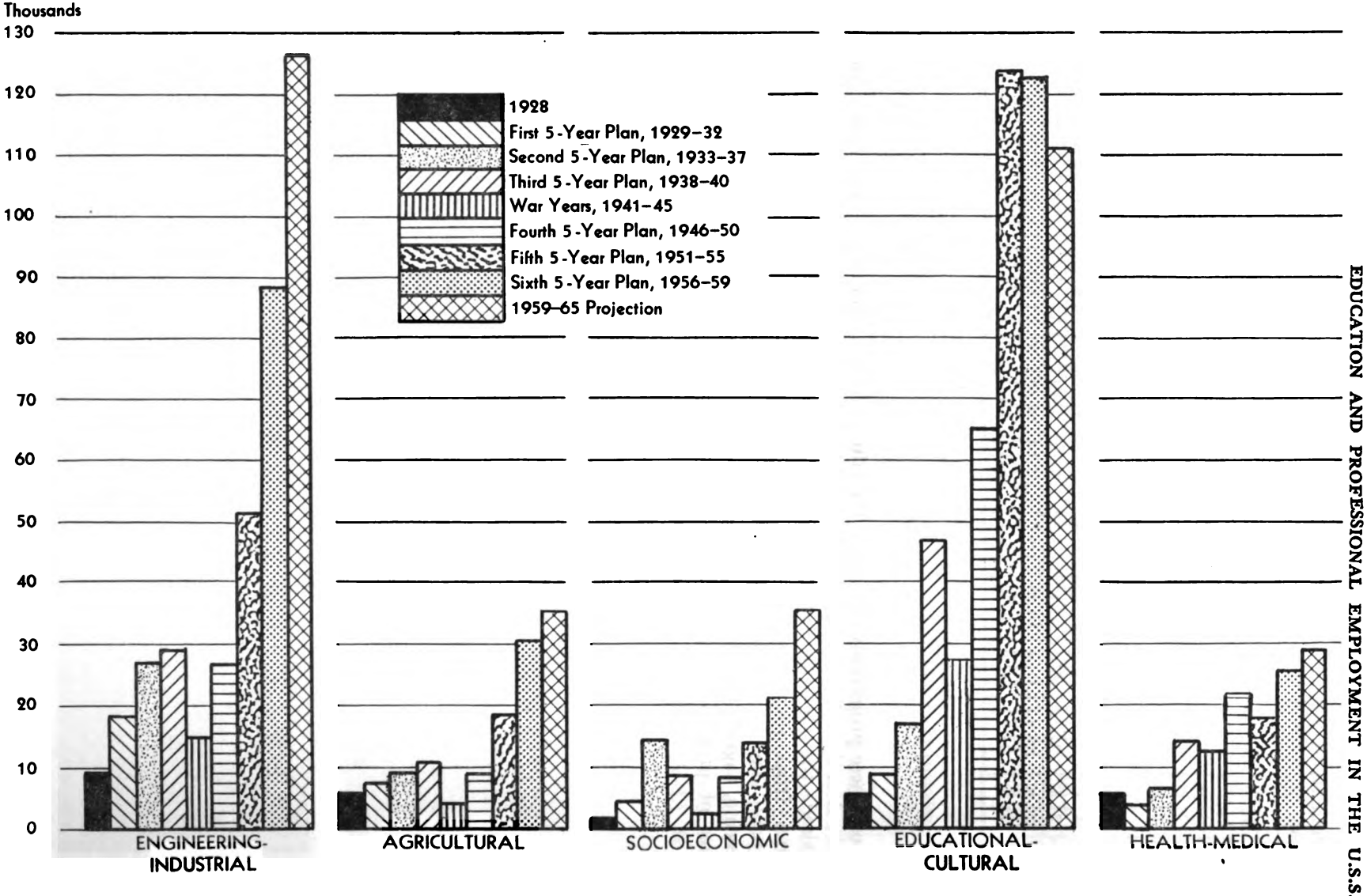
CHART XXIII.—AVERAGE ANNUAL NUMBER OF SOVIET PROFESSIONAL GRADUATES IN SPECIALTY FIELDS BY PERIOD, 1928–59 AND 1959–65 PROJECTION



Sources: Appendix tables IV–A–1–G and IV–A–3.

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5. *Comparison of Soviet and American Graduating Classes*

The foregoing discussion has centered upon graduation trends in Soviet higher education by areas of specialization. In the course of the discussion, it was pointed out that present total Soviet enrollment in higher education, including part-time programs, is two-thirds the enrollment of resident students in U.S. colleges and universities, and only one-third if Soviet part-time enrollment is not included. It was also brought out that only 12 percent of the total higher education age population in the U.S.S.R. actually are enrolled in any kind of higher education program, and only 6 percent in regular full-time programs, as compared to 25 percent of the college-age population attending institutions on a full-time basis in the United States. When the sizes of annual graduating classes in the two countries are compared, however, the numerical gap becomes substantially reduced. One of the chief reasons for this is the substantially higher "success" rate of Soviet higher education students. Chart XXIV illustrates the narrowing of the U.S. margin of superiority in graduations over the last two decades. In 1959 the difference in aggregate size of the respective graduating classes was 25 percent, counting all U.S. recipients of degrees and all Soviet professional graduates. If we count only recipients of bachelor's and first professional degrees in the United States, the difference is reduced to about 8 percent (U.S.S.R., 1959–338,000; United States, 1958–366,000). In 1960 the United States widened the gap further, however, to 40 percent (United States, 405,000 bachelor and first professional degrees, and 76,000 master degrees) more than the total number of Soviet higher education graduates (342,000). The total number of Soviet professional graduates was 18 percent less than the number of U. S. bachelor and first professional degrees in 1960.

This comparison of graduation trends does not, however, take into account the radical structural differences between Soviet professional training and college and first professional degree training in the United States. There is a radical difference in the composition of the respective graduating classes in terms of distribution. Table IV–51 illustrates these differences.

Before venturing into comparisons, it should be noted that any undertaking of this sort is only partially satisfactory. There are many difficulties which cannot be solved because of certain differences in the grouping of graduates, as well as qualitative differences (especially the fact that in the U.S.S.R. about 30 percent of the annual graduates come from extension-correspondence programs), which are hard to define in the case of either country. Nevertheless, a comparison can be made which will be valid as an approximation.

Table IV–51 shows that in the Soviet Union about 57 percent of the total 1959 graduating class was composed of engineering, other natural and physical science, and applied science majors. If science majors in Soviet pedagogical institutes (40,000, or 11.8 percent of total graduates) are added, the percentage is even larger. In the United States, on the other hand, only about 24 percent of total 1958 graduates were in the engineering and other natural and physical science fields. Although, as we have already mentioned, the Soviet "engineering" classification contains some categories (totaling about 10 percent) which in American practice would not be so classified, this does not appreciably affect the validity of the comparison. Engineering graduates alone constituted only 10 percent of the total U.S. graduating class, as against 32 percent in the Soviet Union. All agriculture majors made up about 10 percent of the total Soviet graduates, while in the United States they represented only a little over 2 percent. Medical-health graduates in the Soviet Union, consisting primarily of physicians, accounted for about 9 percent of total graduations, as against 6 percent in the United States. It must be noted, moreover, that the Soviet medical category excludes medical technicians and nurses (trained in semiprofessional schools), who are included in, and represent a sizeable proportion of, U.S. medical field graduates; and also that Soviet graduates in this field include a much smaller proportion of pharmacists and other such specialists than is the case in the United States. If medical doctors alone are considered, the U.S.S.R. had a four to one advantage: physicians accounted for 8 percent of

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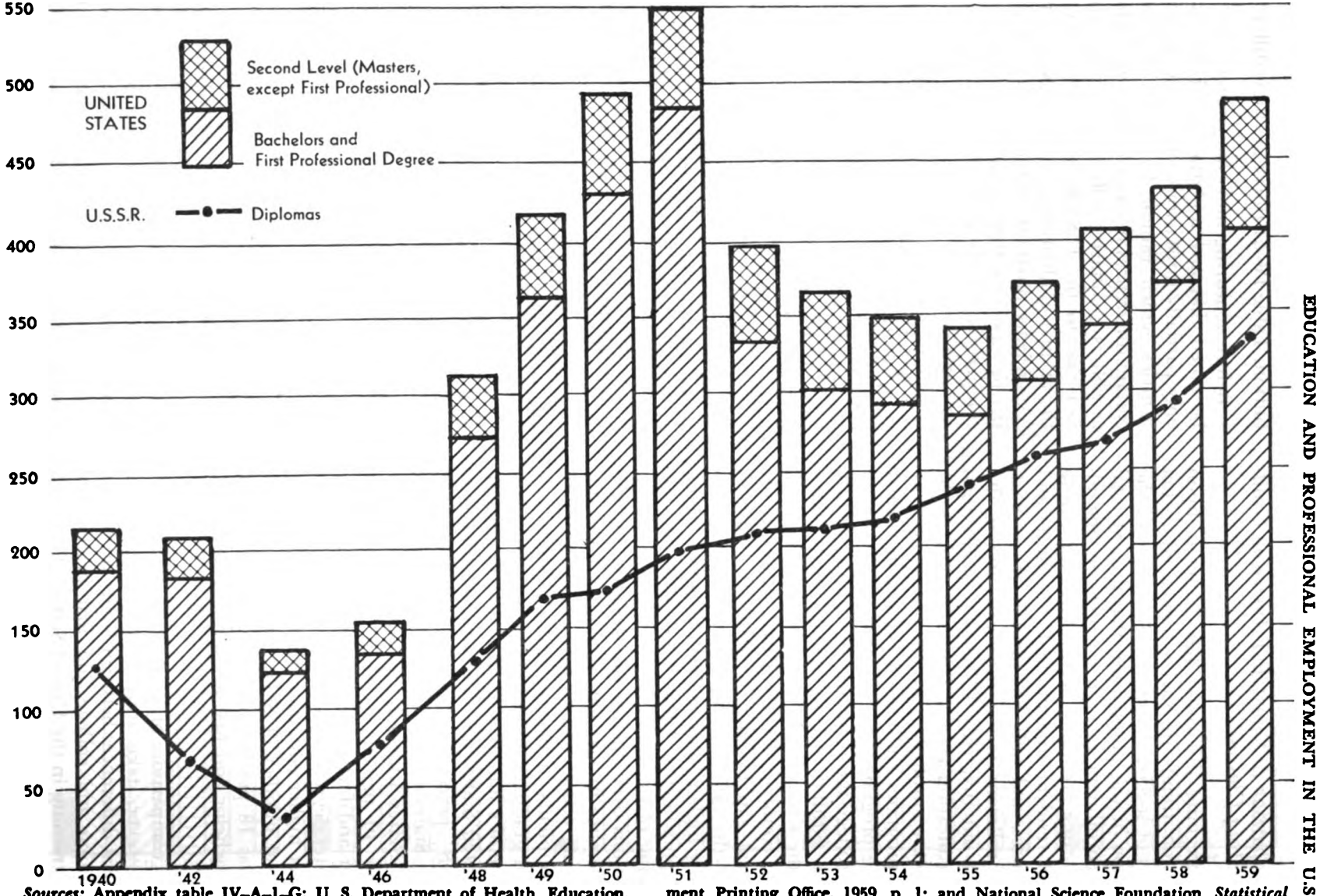
CHART XXIV.—COMPARISON OF TOTAL ANNUAL HIGHER EDUCATION GRADUATING CLASSES IN THE UNITED STATES AND THE U.S.S.R., 1940–59



Sources: Appendix table IV–A–1–G; U. S. Department of Health, Education, and Welfare, Office of Education, *Earned Degrees Conferred by Higher Educational Institutions, 1957–58*, Circular No. 570, Washington, D.C.: U.S. Government Printing Office, 1959, p. 1; and National Science Foundation, *Statistical Handbook of Science Education*, No. 60–13, Washington, D.C., U.S. Government Printing Office, 1960, p. 19.

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TABLE IV–51.—*Structure of graduating classes in the U.S.S.R. and the United States*

U.S.S.R. 1959[b]			United States, 1958[b]		
"Diploma" graduations by field of study			Bachelor's and first professional degree by field of study		
Field	Thousands	Percent	Percent	Thousands	Field
Grand total	338.0	100.0	100.0	366.0	Grand total
I. Engineering, all fields	108.6	32.2	10.2	37.3	I. Engineering, all fields (35.3) and ROTC programs (2.0).
II. Agricultural, including agronomy and animal husbandry, forestry and veterinary medicine.	34.5	10.2	2.1	7.6	II. Agriculture (5.5), including agronomy and animal husbandry, forestry (1.3) and veterinary medicine (0.8).
III. Socioeconomic (economics, management and jurisprudence).	25.0	7.4	18.6	68.2	III. Business and commerce (51.3), economics (7.5) and law (9.4).
IV. Educational-cultural, total	140.4	41.5	62.7	229.6	IV. Educational-cultural, all fields, and among these:
1. Of which university programs, total	37.6	11.1			
And among these:					
a. Mathematical, physical and biological sciences	(21.0)	(6.2)	9.7	35.7	1. Science majors: mathematical (6.9), physical (14.4) and biological (14.4).
2. Teacher training establishments.	91.4	27.0	22.7	82.9	2. Education (teacher training establishments and education majors only).
(Of which mathematics and science teachers only).	(40.0)	(11.8)			
3. Other cultural service fields	9.0	2.7	26.5	97.2	3. Humanities, languages and social sciences—English and journalism (19.2), foreign language and literature (4.5), geography (0.8), social sciences (except economics) (40.7), psychology (6.9), philosophy (3.0), religion (8.8), home economics (4.3), library science (1.7), other miscellaneous (7.3).
4. Fine arts	2.4	0.7	3.8	13.9	4. Fine arts (12.3) and architecture (1.6).
V. Health fields, total	29.5	8.7	6.4	23.2	V. Health fields, total
Among which:					Among which:
a. physicians only	(27.0)	(8.0)	(1.9)	(6.9)	a. M.D.'s only.
Engineering, science and applied science professions (excluding science teachers) (sum of I, II, IV-1a, Va).	191.0	56.6	23.9	87.7	Engineering, science and applied science professions (excluding teachers-science majors) (sum of I, II, IV-1, Va).

Sources: [a] Appendix table IV–A–1–G. For distribution of university graduates in sciences, see discussion in text above. [b] U.S. Dept. of Health, Education and Welfare, Office of Education, *Earned Degrees Conferred by Higher Educational Institutions, 1957–58*, Circular No. 570, Washington, D.C., U. S. Government Printing Office, 1959, esp. pp. 5–9.

all Soviet graduates compared to 2 percent in the U.S.

In number of graduates in the physical and biological sciences, the United States had a substantial lead over the U.S.S.R. (35,700 to 21,000). In the United States, however, these graduates included perhaps 5,000–10,000 who were trained as prospective science teachers, whereas this category was entirely *excluded* from the Soviet figure since science teachers in the U.S.S.R. (numbering about 40,000) are trained separately in pedagogical institutes. In all fields of the humanities and social sciences, the United States had a substantial lead over the U.S.S.R. In the socioeconomic field, the number and proportion of business and law majors in the U.S. graduating class were also 2½ times as large as the U.S.S.R.'s socioeconomic branch graduates.

Thus, except in the physical and biological sciences and mathematics, the Soviet Union, with a smaller total graduating class, produced more professionals in various engineering, applied professional and scientific fields than the United States. The Soviet Union graduated three times as many engineers, five times as many agricultural specialists, and about four times as many physicians as the United States

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did. At the same time, of course, the Soviet Union had a much smaller number of "other field" graduates—i.e., in the humanities, the social sciences, and the liberal arts—which accounted for 26 percent of all United States graduates and an 11-fold lead over the U.S.S.R. in these areas.

These comparisons emphasize dramatically the trend which has prevailed through the 1950's. While the Soviet Union trails behind the United States—and will continue to trail behind in the foreseeable future—in aggregate annual numbers of higher education graduates, its carefully planned emphasis upon scientific-technical training has already achieved an unquestioned numerical advantage in these strategic fields. The U.S.S.R. now maintains an annual flow of scientific and technical professional manpower from its higher educational institutions two to three times larger than that in the United States, and this effort will unquestionably continue.

Behind this emphasis lies a basic policy calculation. The Soviet regime, in planning the overall program of higher education, has placed paramount emphasis on science and technology in the belief that professional engineers and scientists can perform managerial, administrative, economic and business-coordinated jobs "better" than nontechnically trained professionals, business and liberal arts majors. This belief is reflected in Soviet priorities for professional training, and as will be shown in ch. VI, it underlies the fact that engineers manage Soviet industry and supervise planning and distribution. A significant proportion of Soviet engineers, scientists and agricultural specialists are involved in administrative tasks and running the Soviet Government.

Past, present and future, Soviet planners have stressed and will continue to stress functional education, in which scientific-technical training tops the list. Next in priority comes the training of specialized teachers in order to provide a feedback for further training along the same lines. This type of one-sidedly scientific and technical education, producing specialists who are little interested in human and ethical values, apparently is considered to provide the most suitable and pliable kind of manpower for running the affairs of the communist state.

6. *"Success" Rates of Students in Soviet Higher Education*

From data on admissions and graduations, it is possible to estimate the graduation or "success" rate of students in Soviet higher education.[45] This rate is expressed in terms of the proportion of entering students who graduate after successfully completing the prescribed program for their particular specialty field. Appendix table IV–A–2 provides estimated graduation (success) rates for various years and periods.

During the 1930's, graduation rates fluctuated considerably in the Soviet Union. For some classes entering training in the early 1930's, rates were as low as 30 graduations per 100 admissions. Toward the end of the 1930's, starting with the entering class of 1933, the graduation rate tended to stabilize at an average level of about 60 graduations per 100 admissions for all fields. The rate was slightly above this figure for nonengineering fields and about 55 percent for engineering.

At the present time, Soviet higher education programs range from 4 to 6 years in length. Because of variations in the length of training between programs even in the same specialty group, graduation rates cannot be calculated exactly for students in a specific, narrowly-constricted field—and usually data on admissions and graduations for such narrow fields are unavailable. Of the various specialty groups, the medical-health category is perhaps the one for which success rates could be most accurately estimated, because of the fact that medical-health programs uniformly[46] last six years. However, for purposes of a rough approximation, it can be assumed that training in Soviet higher educational establishments lasts, on the average, about 5 years. (An approximate calculation suggests that the "average" length of programs in the mid-1950's was about 4 years and nine months.)

Estimates of graduation rates for the 1950–59 period (see appendix table IV–A–2)[47] reveal an interesting pattern. In the first place, there is

[45] The data presented here are derived from the absolute figures in appendix tables IV–A–1–A and IV–A–1–G. Graduation rates for the postwar year are also given in appendix table IV–A–2.

[46] With the exception of stomatology—5 years.

[47] Note that the graduation rates shown in the table are estimated on the basis of a 4- or 5-year program of study. Averaging these rates implies a 4.5-year program of study.

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an obvious difference between the rates for regular students and those for extension-correspondence students: apparently, only about half the latter succeed in completing their training, whereas about four out of five students in regular full-time programs graduate.

In the postwar period there apparently was a wave of "returning" students; as a result, the graduation rate was at an abnormally high level through 1952–53 (90 percent for graduates of regular full-time programs), but by 1955 the rate had leveled off to about 77 percent. The leveling-off process continued through 1958, and not until 1959 was there a slight upturn.

The phenomenon just described illustrates very clearly that estimated graduation rates may often be substantially affected by external factors totally unrelated to academic performance. Any factor which causes abnormally large withdrawals of students from higher educational programs, either temporarily or permanently, will necessarily have an impact on the computed success rates. Wartime mobilization measures, or large-scale military draft calls in times of international tension, represent such a factor of primary significance. The impact, moreover, is twofold since the eventual termination of these measures reverses the process: i.e., it causes a reinflux of students released from military service, producing a subsequent reverse impact on graduation rates. Thus, the sudden upturn in the estimated graduation rate in 1959 may well have been the result of the large-scale demobilization of Soviet active-duty troop strength in 1956–57.[48]

Graduation rates not only fluctuate over the years, but they also reveal significant differences between individual fields of study. Table IV–52 presents data on admissions in 1950 and graduations by branch, on the basis of which (assuming an "average" 5-year course of study) the graduation rates shown were estimated. Considering regular full-time programs only (line R in table), the rates range from a "low" of 67 for education to a "high" of 96 for agriculture.

TABLE IV–52.—*Estimated graduation rates for Soviet higher education students, by branch, 1950–55*

Specialty branch		Acceptances 1950 (thousands)	Graduations 1955 (thousands)	Graduation rate 1950–55
Engineering total...	T	86.0	65.9	76.6
	R	70.1	62.2	88.7
	E	15.9	3.7	23.3
Industry and construction	T	74.0	56.4	76.2
	R	60.2	53.2	88.3
	E	13.8	3.2	23.2
Transportation and communication.	T	12.0	9.5	79.1
	R	9.9	9.0	90.9
	E	2.1	0.5	23.8
Agriculture.....	T	28.5	24.1	84.5
	R	23.8	23.0	96.6
	E	4.7	1.1	23.4
Socioeconomic.....	T	25.5	15.6	61.1
	R	12.8	9.0	70.3
	E	12.7	6.6	52.0
Educational-cultural total.....	T	185.4	123.3	66.5
	R	108.7	73.1	67.2
	E	76.7	50.2	65.4
Education.....	T	182.6	120.8	66.1
	R	106.1	70.7	66.6
	E	76.5	50.1	65.4
Arts.....	T	2.8	2.5	89.2
	R	2.6	2.4	92.3
	E	0.2	0.1	50.0
Medicine, health and physical culture.	T	23.7	16.8	70.8
	R	22.2	16.2	72.9
	E	1.5	0.6	40.1
Total.....	T	349.1	245.7	70.3
	R	237.6	183.5	77.2
	E	111.5	62.2	55.7

T—Total R—Regular E—Extension-correspondence.
Source: Data compiled from *KS–1956*, pp. 212–15.

It has been suggested in one Western study[49] that Soviet planners, in effect, predetermine "success rates" by fixing quotas for numbers of graduates, and that a "consistently" high success rate is indicative of a relaxation of academic standards in order to meet these quotas—in other words, standards are lowered whenever necessary to meet the prescribed success rates.

[48] The existence of such a practice was legitimized by a 1960 law (*Pravda*, Jan. 26, 1960), which allowed those discharged from the armed services to enter higher education in an advanced year of study provided that they—the majority of them commissioned officers—have had "partial" higher education in military service.

[49] Korol, *Soviet Education*, esp. pp. 192–201. This study uses the continuing flow (aggregation) method of estimating the success rate, with results for 5-year periods the same as indicated in the 1946–50 and the 1951–54 totals in appendix table IV–A–2. The continuing flow method has the disadvantage that it disregards annual (or 2-year aggregate) fluctuations in graduation rates.

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But while this may indeed be true in isolated cases, and if we disregard the abnormal rates caused by external factors, the wide fluctuation of annual rates in recent years (from a low of 70 to a high of 90 between 1950 and 1959)[50] indicates that this is by no means a regular practice. There is no "consistently" high rate to suggest deliberate tampering, although Soviet planners readily admit that they use "planning" norms with respect to the "success" of students. That the actual rates deviate considerably from the norms seems sufficient indication that the predetermined rates have little effect. A more realistic explanation is probably the high motivation of Soviet higher education students and the national system of stipends which lessens, but does not eliminate, their economic burden.

The long-term graduation rates used by Soviet planners in their projections and hypothetical computations (for a 20-year planning period) are only about 45 graduations per 100 admissions for the engineering and scientific fields (5-year programs of study), and about 60 graduations per 100 entries for other fields of study.[51] The actual rates in recent years have apparently been higher than the planning norms. What inference can be drawn from this with regard to the maintenance or slackening of academic standards, however, is anyone's guess. We have only aggregate information to go by, and the success rates indicated—3–4 percent of dropouts or expulsions per annum, yielding a cumulative "success" rate of 75–80 percent—suggest that grading[52] and weeding-out processes are certainly enforced to some extent.

The actual rate of student failures in individual Soviet higher educational establishments is very hard to ascertain. It undoubtedly varies with the type of institution, the study program, and the locality. In Armenia, for example, about 20 percent of the students in higher educational institutions reportedly received failing grades in the first-term examinations in the academic year 1956–57.[53] Of course, not all of these were expelled since a student can take "makeup" examinations in one or two subjects per term.

According to a Western source, the rate of student expulsions for Moscow State University due to all causes, i.e., disciplinary action or failing grades, was about 5 percent in 1957.[54] A Soviet source reports that during the academic year 1956–57, 4,300 students were expelled from higher educational institutions in Leningrad,[55] which represents an expulsion rate of 3.6 percent.[56] These individual reports are not out of line with the aggregate picture presented above.

7. *The Role of Women in Soviet Higher Education*

The role of women in Russian higher education dates back to the era of Catherine the Great. In May 1764 a school for daughters of the nobility was set up in St. Petersburg under the auspices of the Society for the Education of Girls of Noble Birth (*Vospitatel'noe Obshchestvo Blagorodnykh Devits*), which was, by the standards then prevailing, a secondary school. A similar school for girls of other social classes, the *Smol'nyi Institut*, was also established in St. Petersburg. Training in both schools was of the traditional type for girls of good breeding, stressing cultural subjects such as fine arts, music, literature, philosophy and religion. However, the first real penetration by women into a full-fledged Russian university came a century later, in 1861, when the University of St. Petersburg began to admit women. This experiment did not last long, however, because a proposal originated by the Imperial Government to open all Russian universities to women was opposed by the faculties of most of the universities, which, even though financed by the state, enjoyed complete autonomy in academic matters. Most universities agreed, however, that women could be admitted as "freelance students" (*vol'noslushateli*), which meant that they could attend lectures and classes but could not be registered as regular students.

[50] Appendix table IV–A–2.
[51] Sinetskii, *PP Kadry*, p. 201.
[52] But, see section on "Examinations and Grading," above.
[53] *Kommunist* (Armenia), Jan. 13, 1957. The report further states that 3,000 students in higher educational establishments and technicums in the city of Erivan received failing grades at mid-term. Enrollment in higher educational establishments and technicums in the Armenian SSR in that year was 36,000 (*ibid.*, Jan. 12, 1957). In 1955–56 the city of Erivan accounted for about 29,000 students (*KS-1956*, pp. 70–71).
[54] *Novoe Russkoe slovo* (New Russian Word) (New York), May 5, 1958, reported that 600 students were expelled in 1957. Full-time enrollment was about 12,000.
[55] *Komsomol'skaia pravda*, Mar. 13, 1958.
[56] *KS–1956*, p. 46; *KS-RSFSR–1958*, p. 355. In 1956 full-time enrollment in Leningrad was 120,000, and total enrollment, 155,000.

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At about the same time, in 1863, the first genuine higher educational establishment for women was set up in St. Petersburg under the name of Higher Pedagogical Courses for Women (*Vysshie Zhenskie Pedagogicheskie Kursy*), subsequently reorganized as the Women's Pedagogical Institute. In 1872 a medical school for women on the model of the pedagogical school was set up in St. Petersburg. Initially called Higher Medical Courses for Women (*Vysshie Zhenskie Meditsynskie Kursy*), this school was reorganized in 1897 as the Women's Medical Institute (eventually becoming the Leningrad Medical Institute after the 1917 Revolution). In 1870 pedagogical courses for women were put into operation in the provinces (Kiev, Kazan', and other cities).

In the 1880's some of these newly established higher educational "courses" for women closed down. Soviet sources today claim that this was the result of opposition by the Czarist Government, which allegedly feared that they would encourage the "progressive" orientation of women. Whatever truth there may be in this claim, it is a fact that many of the 19th century institutes for women closed, or collapsed, partly for economic reasons. Like the universities, they charged tuition fees at a time when it was fashionable to study abroad, and many Russian women of well-to-do families preferred to attend universities in Zurich, Geneva and Paris.[57]

In any case, after an interlude of inactivity, the "courses" were resumed and, by the mid-1890's, numbered about a dozen. By the turn of the century many of these had been reorganized into full-fledged institutes (medical and pedagogical, among others). By 1910 even agricultural and "polytechnical" (i.e., engineering) courses for women had been set up in St. Petersburg. Most of these women's "courses" and institutes differed from regular universities and other higher educational establishments in name only, for the content of instruction was about the same. In some instances, students in the women's institutes attended lectures in cooperating men's universities or institutes located in the same city. In point of fact, then, long before the Revolution, equal though separate[58] higher education for women existed in Russia. In numerical terms also, the enrollment of women was significant before the Revolution. In 1914, according to one source, there were 17,100 women enrolled—representing 17.4 percent of total higher educational enrollment.[59]

From the first, the Bolshevik regime has proclaimed equality of the sexes and the "emancipation" of women as basic principles of socialist society. Lenin wrote that "the level of culture of a society can be told by the legal status of women in that society."[60] Accordingly, legal steps were taken immediately after the Revolution to give women equal access to higher education, and provisions for equal voting rights and equal wages were also legislated by the Soviet regime. Article 122 of the Stalin Constitution of 1936 proclaimed:[61]

> Women in the U.S.S.R. are accorded equal rights with men in all spheres of economic, government, cultural, political and other public activity.
>
> The possibility of exercising these rights is ensured by women being accorded an equal right with men to work, payment for work, rest and leisure, social insurance and education, and by state protection of the interests of mother and child, state aid to mothers of large families and unmarried mothers, maternity leave with full pay, and the provision of a wide network of maternity homes, nurseries and kindergartens.

Thus, women in the Soviet Union enjoy educational equality under the law, but the real question is whether they enjoy it also in fact. Soviet propaganda itself suggests that they do not, for it continues to call for the "liquidation of survivals of actual inequality of women."[62] This refers particularly to the persistence of

[57] In 1889, for example, of the 152 women students at the Sorbonne, two-thirds—107—were Russian (*VVSh*, No. 11, November 1957, p. 49).

[58] There was a brief interlude in 1905–06 when women were again admitted to the regular men's universities, but this also proved abortive as in 1861–63.

[59] Beilin, *Kadry*, p. 348. The statistics on both women students and total enrollment are incomplete in this source. It reports 1914 total enrollment as 104,600, while officially it was 112,600 (within pre-1939 U.S.S.R. boundaries) or 124,600 (within post-1945 U.S.S.R. boundaries). Women students were predominantly in pedagogical and medical fields, which accounted together for 15,500 students, leaving 1,600 for all other fields.

[60] Lenin, *Sochineniia*, Vol. 30, p. 382.

[61] Translation of Constitution of the U.S.S.R., in H. McClosky and J. E. Turner, *The Soviet Dictatorship*, New York: McGraw-Hill, 1960, appendix II, p. 629.

[62] Or, as it is called in Russian, "*likvidatsiia faktícheskogo neravenstva zhenshchin.*" See V. G. Sinitsyn, *Rozdenie kommunisticheskogo byta* (The Birth of Communist Life), Znanie Series II, No. 2, Moscow, 1960, p. 25.

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inequality of opportunity in the professional sphere, not as concerns admission to higher education, but in choice of career and opportunity for advancement—and these inequalities are reflected in limitations on the accessibility to women of certain fields of professional specialization in higher education.

Ever since the Revolution, Soviet higher educational institutions have been coeducational. This was true even during the late 1940's and early 1950's, when separate education for the two sexes was in effect on a limited scale in secondary schools. Each year's admission rules reaffirm the equality of sexes.[63] In 1926 the proportion of women among all students enrolled in Soviet higher educational establishments was about 31 percent,[64] a higher proportion than most European countries could claim in the mid-1950's but about the same as the United States already had in 1910 (32 percent). About 50,000 women were enrolled in Soviet universities and institutes in 1926. Though the absolute figure is not impressive, it represented a high proportion of the low total enrollment base of 160,000.[65] In 1927–30 the proportion of women among higher education students declined slightly, to 28–29 percent; still, it is obvious that even before the start of forced industrialization, which brought about the large-scale integration of women into the labor force, women were an important factor in Soviet professional higher education.

With industrialization, legislative steps were taken to expand the enrollment of women in Soviet higher education. In February 1929 the Soviet Government issued a decree reserving 25 percent of total admissions to higher educational establishments, beginning September 1930, exclusively for women.[66] The decree actually benefited women seeking higher education only in certain fields and individual institutions where the proportion of women was below the authorized minimum of 25 percent. In the medical and health field, the proportion of women students had reached a level of almost 50 percent long before the decree was enacted, and the measure therefore had no effect. In other fields, especially engineering and agriculture, however, it brought about a considerable increase in the proportion of women students between 1930 and 1932.

Appendix table IV–A–5 provides data on the proportion of women among students by field of study in all years since 1926 for which data are available. Chart XXV, based on these data, illustrates the changing proportion of women students by field for several benchmark years during the last three decades. During the prewar decade, the relative proportion of women among Soviet higher education students, and consequently among graduates, increased considerably. The proportion of women declined slightly in the agricultural, educational and medical fields during 1935–37 and then increased again. The steady increase of women engineering students made up for these fluctuations, however, and the overall proportion of women in total higher educational enrollment continued to rise, reaching 43 percent by 1937.

Between 1937 and 1940, the proportion mounted even more sharply, attaining 58 percent in the latter year. There are two possible explanations for this increase. First, enrollments in education and medical programs expanded greatly during this period, and women had always accounted for a major proportion of enrollment in these fields. Secondly, the military draft just prior to World War II drained off many young men eligible for higher education. As a result of these two factors, the proportion of women enrolled in higher education reached its alltime peak in 1940, not only overall but also in each individual branch. In education and medicine, women accounted for 67 and 74 percent of the respective total enrollments in those branches. Even in engineering, where their representation was lowest, the proportion of women students reached an all-time high of 40 percent.

Although statistical information remains unavailable regarding the distribution of students by sex during the war years, it is reasonable to assume that the proportion of women in higher education rose considerably in the first part of the war and then tended to level off in the closing years. It has been reported by Western observers that the 1946–49 graduating classes

[63] See *Sprav VUZ* for various years; see also appendix IV–AR.
[64] Appendix table IV–A–5.
[65] Supplement to appendix table IV–A–1–E.
[66] This regulation also applied to technicums and workers' faculties. See *BSE–1st*, vol. 25, p. 261.

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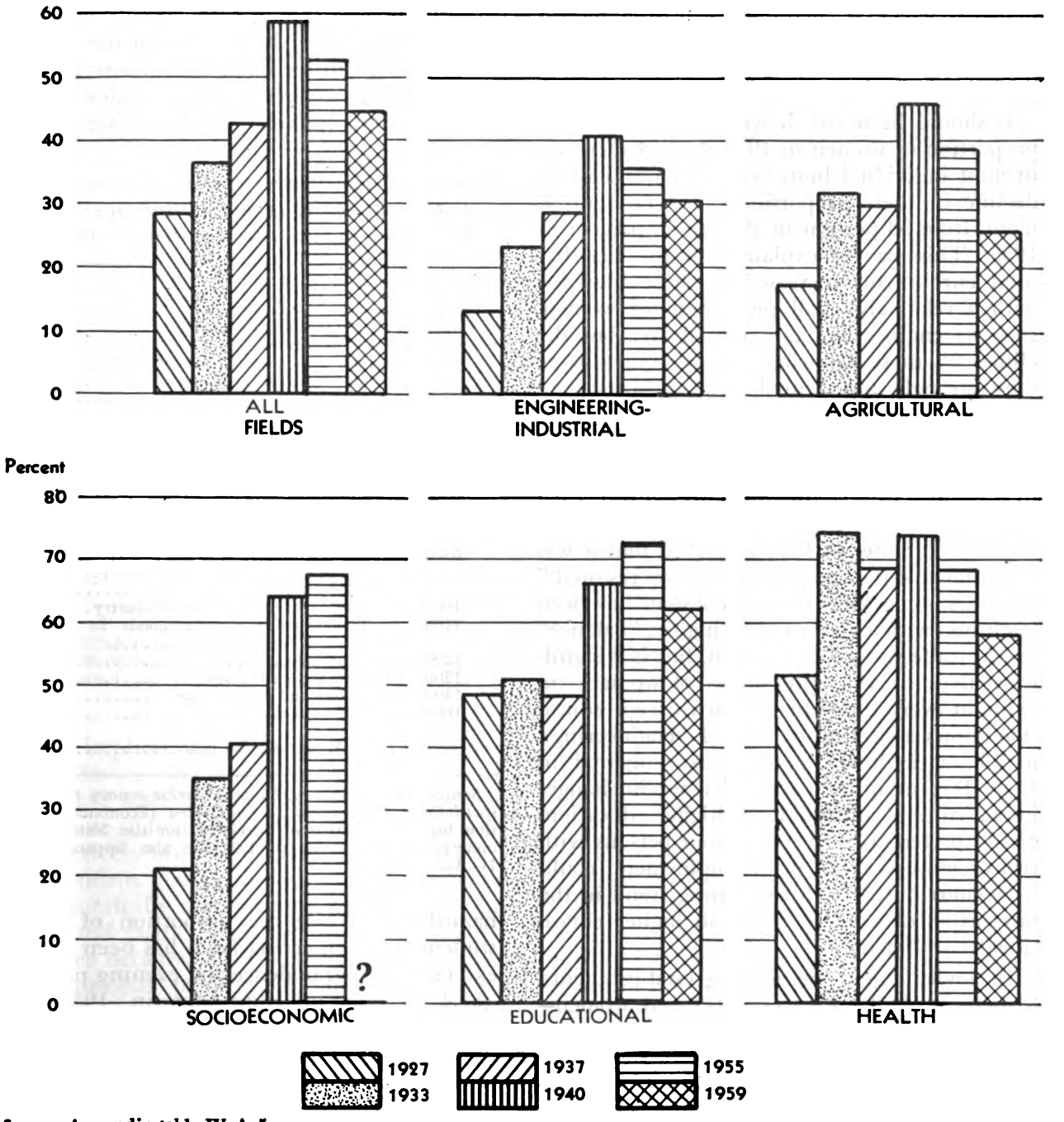
CHART XXV.—PROPORTION OF WOMEN AMONG SOVIET HIGHER EDUCATION STUDENTS BY FIELD IN SELECTED YEARS, 1927–59



Source: Appendix table IV–A–5.

were composed largely of women, but that the situation "eased up" thereafter.[67] In 1950 the proportion of women enrolled in every branch except education declined considerably in comparison to 1940, doubtless reflecting the re-influx of male students released from the armed serv-

[67] Note that official statistics concerning the proportion of women in higher education have not been released for the 1940's.

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ices. By 1955, the impact of this factor had spent itself, and there was again an increase in the proportion of women enrolled in all branches except agriculture, probably helped by the new military mobilization measures spurred by the Korean War crisis of the early 1950's.

It should be noted, however, that while the proportion of women in 1955 showed increases in most individual branches, there was a slight decline in their proportion of overall enrollment, from 53 percent in 1950 to 52 percent in 1955. This may be explained by the fact that total enrollments increased in those branches with a relatively small proportion of women, such as engineering and agriculture, but declined in those branches where women were most strongly represented—i.e., education and medicine.

Between 1955 and 1959 the proportion of women students declined not only in relation to overall enrollment but also within each branch. A Soviet education official who visited the United States in 1959 remarked that it was high time that the "proper balance was restored." Whether some kind of quota system has been instituted with a view to restoring the "balance" between the sexes is not known, but it is significant that the 1959 proportion of women students in every individual branch except education shows a decline of from 4 (engineering) to 13 (agriculture) percent, as compared to 1955. It seems quite possible that recent changes in the rules of admission for higher education, giving preference to veterans and persons with two or more years of prior employment, could have contributed to this declining trend in the proportion of women in overall higher educational enrollment.

In Soviet higher engineering establishments, 31 percent of all students in 1959 were women—a higher proportion than in any West European country or the United States. It should be noted, however, that in the Soviet Union, because of differing conditions of employment for women in different sectors of industry (women comprise the dominant component of employees in consumer goods industries, textiles, food processing, etc.), there are correspondingly sharp divergences in the proportions of women students in the various engineering-technical fields, as shown in table IV–53. It has been a frequent Soviet complaint that the numbers of women enrolled in such specialty fields as mining, metallurgy, and certain fields of machine-building are "excessive" in relation to the employment opportunities open to women in these fields, which are restricted by rules barring women from certain jobs involving "health hazards."[68] While the proportion of women students in engineering fields has been large in extension-correspondence and evening programs (55.4 percent of admissions in 1956 were women), these types of programs are said to be more suitable for male "practicals" (i.e., persons without specialized education employed in occupations calling for such training—see ch. VI) already employed in technical jobs in in-

TABLE IV–53.—*Proportion of women among students in Soviet higher education enrolled in engineering-industrial institutes, 1956–57*

Specialty group code	Specialty groups	Percent women
0100	Geology and exploration of mineral deposits	31.0
0200	Exploitation of mineral deposits	16.6
0300	Power engineering	27.4
0400	Metallurgy	31.5
0500	Machine building and instrument construction	23.8
0600	Electrical machine building and electrical instrument construction	...
0700	Radio engineering and communications	35.3
0800	Chemical technology engineering	60.0
0900	Timber engineering and technology of wood processing, cellulose, and paper manufacturing	34.5
1000	Technology of food products industry	74.5
1100	Technology of consumer goods industry	74.0
1200	Construction	...
1300	Geodesy and cartography	58.0
1400	Hydrology and meteorology	63.0
1600	Transportation	22.6
	All engineering fields	36.0

Source: V. E. Komarov, *Ekonomicheskie osnovy podgotovki spetsialistov dlia narodnogo khoziaistva* (Economic Foundation for the Training of Specialists for the National Economy), Moscow, 1959, p. 192. See also appendix table IV–A–5.

[68] Note that the 1960 rules on admission (see above) state explicitly and for the first time that women are barred from admission to certain of these fields. See the discussion in Komarov, *Ekonomicheskie osnovy*, pp. 190–94, where the rates of training and patterns of employment are contrasted with the demand that employment considerations should be "taken into more account" in admitting women.

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dustry, and the excessive number of women in this type of training was considered an obstacle to accommodating the "practicals."

In the United States the proportion of women in overall college enrollment has ranged from 25 to 35 percent in the last two decades. The proportion of women students in the field of education in the U.S. (about 60 percent) is nearly as high as in the Soviet Union, but in other fields there are sharp divergences. In engineering, agriculture and medicine (excluding nursing), women students form a negligible proportion of the total enrollments in the United States, whereas the proportion of women enrolled in highly specialized fields of engineering, medicine, and agriculture in the Soviet Union is quite substantial. This is clearly revealed by the comparative Soviet and U.S. figures in table IV–54 showing numbers of women students by branch, and their percentage share of total enrollment in the respective branches.

TABLE IV–54.—*Number and proportion of women enrolled in various branches of higher education in the U.S.S.R. and the United States*

Branch	U.S.S.R. (1955)		United States (1954)	
	Number of women	Percentage of enrollment	Number of women	Percentage of enrollment
Education	408,700	72.1	158,100	57.1
Social sciences	89,000	67.0	50,500	23.1
Engineering	203,000	35.4	1,200	.7
Health fields (in the U.S.S.R., medicine proper)	108,000	69.2	29,814	33.1
Agriculture	71,300	39.3	1,300	2.9
Total	880,000	.....	240,914	.....
All fields	967,090	52.3	791,200	34.4

Sources: U.S.S.R.—Appendix table IV–A–5; U.S.: UNESCO, *Access of Women to Higher Education*, No. 58—01732, Jan. 28, 1958, annex 1, pp. 4, 8. This report uses a classification of students not commonly encountered in Soviet sources, and there is some uncertainty as to the degree of correspondence with the usual reporting categories.

The implications of these data are obvious, for if Soviet women are trained on such an impressive scale for specialized professional employment, it follows that they are expected to be effectively utilized in the economy. The figures confirm that in the Soviet Union women are numerically dominant in the areas of education and medicine as they have been for the last three decades. This is partly a continuation of traditional patterns antedating the communist regime, but it is also due in part to the fact that these professions offer employment with working hours and conditions relatively more compatible with woman's role in the family than do the other professions. At the same time, medicine and primary-secondary school teaching are among the lowest-paid professional occupations in the Soviet Union. Put simply, opportunities for higher earnings in the professions of teaching and medicine are very limited, and consequently these professions do not attract large numbers of males.[69] The professional fields in which women dominate thus are less rewarding on the differentiated wage scale: in engineering, scientific research, and management, wages range two to six times the average salary of all workers and employees.

In many of the non-Russian national republics and autonomous national republics within the RSFSR, women outnumber men in higher educational enrollment, but the proportion of women of local nationality is relatively small not only in the higher educational institutions but also in professional employment. In one of the Central Asiatic republics, the Kirgiz SSR, for example, 42 percent of all industrial employees in 1955 were women, but only 7 or 8 percent of these women were of Kirgiz nation-

[69] The average wage of Soviet workers and employees was about 710 rubles per month in the mid-1950's. Salaries of primary and secondary school teachers and of practicing physicians were on a par with this average. See ch. VI, table VI–81.

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ality.[70] In the same republic, the total enrollment in semiprofessional schools and higher educational establishments was 29,200 in 1956,[71] and while half of the students were women, only 3,000, or 10 percent of the total enrollment, were women of local, i.e., Kirgiz or Uzbek, nationality.[72] Again, of 90 women with advanced degrees working in Kirgizia, only 18 were of the indigenous nationalities. Thus, even though the proportion of women students in these republics is only slightly below the national average,[73] the proportion of women of non-Russian nationality represents a very small fraction of the total female enrollments in higher education.

The 1959 statistics for the Tadzhik SSR are even more striking, as shown in table IV–55.

[70] *Sovetskaia Kirgiziia*, Dec. 22, 1956.
[71] *Dos–1957*, p. 315.
[72] *Sovetskaia Kirgiziia*, Dec. 27, 1956.

[73] Soviet sources have not released detailed statistics on women enrolled in higher education by republic. In 1955–56, when women enrollees accounted for 52.3 percent of overall national enrollment (appendix table IV–A–5), the proportion of women students in the Tadzhik SSR was 48 percent; in the Kirgiz SSR, 48 percent; in the Turkmen SSR, 45 percent; and in the Uzbek SSR, 44 percent. (*VVSh*, No. 11, Nov. 1957, p. 5.)

TABLE IV–55.—*Total higher education enrollment and the proportion of women of the local nationality in total enrollment in the Tadzhik SSR, 1959*

Branch	Total enrollment	Number of women enrolled	Percent of total enrollment	Number of women of local nationality[a]	Percent of total enrollment	Percent of women students
Engineering	820	181	22	81	10	45
Agricultural	2,620	366	14	44	2	12
Health	1,640	950	58	219	13	23
Educational-cultural	13,800	4,171	30	1,286	9	31
Total[b]	18,900	5,667	30	1,630	9	29

[a] Tadzhiks and Uzbeks.
[b] The difference between the total and the sum of the four identified branches refers to the socioeconomic branch.

Source: TsSU Tadzhik SSR, *Zhenshchina v Tadzhikskoi SSR* (Women in the Tadzhik SSR), Stalinabad, 1960, pp. 74–77.

Thus, not only was the proportion of women higher education students lower in the Tadzhik SSR (30 percent) than in the U.S.S.R. as a whole (45 percent) in 1959,[74] but also the proportion of women students of the local nationality was considerably outrated by women of nonnative nationality (the majority of them presumably Russians), who accounted for 71 percent of the total enrollment of women. In relation to total enrollment, women of the local nationality accounted for only 9 percent. The majority of the native women were enrolled in the educational-cultural and health branches. Particularly notable is the strikingly low proportion of native women enrolled in the agricultural branch (2 percent of the total), an area which presumably would benefit the heavily rural population.

The above examples indicate that apparently the influence of local customs in some republics, especially those of Central Asia, has still not been overcome, although undeniable gains have been made during the 40 years of Soviet rule.

8. *Composition of Students by Social Origin: Access to Higher Education by Social Class*

Class privilege determines access to higher education in the supposedly evolving "classless society" of the Soviet Union as much if not more than in most capitalist countries.[75] Soviet propaganda claims that graduates of higher

[74] Parenthetically, the decline in the proportion of women in higher education in recent years may be attributed in large part to the decline in such republics as the Tadzhik, where the proportion fell from 48 percent in 1955 to 30 percent in 1959.

[75] An illuminating discussion of the factors affecting access to higher education in the U.S. and the U.S.S.R. may be found in Feldmesser, "Social Status and Access to Higher Education," *loc. cit.*, 92–106.

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educational establishments in the U.S.S.R. are predominantly of "worker origin" are belied by statistical evidence from Soviet official sources themselves.

Throughout the Soviet period, it is true, there has been a deliberate effort to select candidates for professional higher educational training from among students of worker or peasant background. The employment status of the parent (s) or at times of the student himself was used as the basis for determining "social origin." [76] Prior to the introduction in 1927–28 of measures to restrict the access of "socially alien elements" to higher education, and the launching of an extensive campaign to recruit students of "proletarian" origin, about 25 percent of all students enrolled in Soviet higher educational establishments had come from working-class families. During the peak enforcement of these measures in 1932–33, the proportion of such students increased to about 58 percent of total enrollment. The restrictions, however, were abolished in 1935, and by 1938 the proportion of students of working-class origin declined to 34 percent. Thus the "proletarization" drive was an obvious failure, and after 1938 information regarding the social origins of higher education students was suppressed. From then until 1958, discussion of this topic was completely silenced in the Soviet press. It was broached again, however, in the course of the 1958 debate on educational reform. In his memorandum to the party Central Committee on the reform program, Khrushchev himself charged that in the higher educational establishments of Moscow "children of workers and peasants comprise only 30 to 40 percent of the students. The rest . . . are descendants of white-collar employees and the intelligentsia." [77] This complaint confirmed what was already suspected by Western observers; namely, that the actual composition of student enrollment in Soviet higher education was far from conforming to the professed communist ideal of equality of access to education.[78]

Even in 1938 almost half of the students in higher educational establishments were from "other" social groups than the working class, and such students never dropped below a one-third proportion of the total enrollment. These "other" groups—i.e., the intelligentsia, white-collar workers, handicraftsmen (and their children) —accounted in the late 1930's for only 7–10 percent of the Soviet population; yet they provided 45 percent of the students in higher educational institutions. Thus, the "proletarian" groups—workers and peasants (the latter alone accounting for almost 60 percent of the population)—were obviously not represented in higher education in anything like fair proportion to their numbers. This is significant since it can be estimated from available data that more than half the professional personnel in the Soviet Union in 1940 came from the nonworker and nonpeasant groups. Thus, the very groups which had originally been denounced as "socially alien elements" in a proletarian society reasserted themselves as the major component of Soviet professional manpower. As revealed by Khrushchev's statement, these trends intensified in the postwar period. They may be best shown by the summary data in table IV–56.

The professed intention behind the new rules of admission for higher education, instituted under the 1958 reforms, is to curb these trends, or at least to "proletarize" students of nonworking class origin by exposing them to a period of full-time employment before they are allowed to enter higher education to complete their professional training. To what extent the present drive will succeed in "equalizing" opportunity of access to higher education—and, particularly, to what extent the new attempt at social preselection of students will again prove detrimental to the quality of higher education as was the earlier proletarization drive in the 1930's—cannot yet be foreseen. Khrushchev himself has indicated, however, that the selection

[76] It has been, and still is, a function of the Soviet Statistical Administration to gather and compile data on the "social origin" of all students in higher education (Bukhman, *op. cit.*, p. 19 and reporting form IV on p. 52). These data have been made public for the 1930's only, however, and are presented in appendix table IV–A–6. "Social origin" is defined as the student's occupation at the time of admission, or the parent's current occupation. Four categories are used: worker, collective farmer, employee (military officers, for example), and "other" (unspecified).

[77] *Pravda*, Sept. 21, 1958.

[78] This ideal, of course, is envisaged for the future, when communism is fully achieved and free of capitalist survivals. As long as the latter persist in the socialist phase, the discrimination against the bourgeoisie and their descendants is considered not only just but essential as a means of establishing the communist society. This discrimination was most obvious during the first stage of Soviet educational policy, from the Revolution until the early 1930's.

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TABLE IV–56.—*Composition of Soviet population by social origin (1955), proportion enrolled in higher education (1938) and in the higher educational establishments of Moscow (1958)*

[In percent]

Social origin	Estimated proportion of Soviet population (1955)	Proportion enrolled in higher education	
		1938	1958—Moscow
Professionals and intellectuals	2	44.5	60–70
Semiprofessionals	4		
White-collar workers	11		
Workers	26	33.9	30–40
Peasants	57	21.6	
Total	100	100.0	100

Sources: The estimate of the Soviet population by social origin is the author's, based on data in *NKh–1957*, pp. 19, 202. Data on the proportion enrolled in higher education are from appendix table IV–A–6 and *Pravda*, Sept. 21, 1958.

of students to be admitted to higher education will be based not merely on academic ability and the "desire to study," but also on the individual candidates' record of "social activity" as judged by "social organizations" such as the Communist Party, the Komsomol, and the trade unions. In particular, Khrushchev declared, the screening of candidates must "make certain that the person is worthy of the expenditure of money for his education and that he has demonstrated that he can really become a useful leader in production." [79] One may well ask whether such social preselection of students for admission to higher education represents an "equalization" of educational opportunity or, in fact, a departure from it.

9. *Regional Differences in the Availability of Higher Education*

In 1958 two cities—Moscow and Leningrad—accounted for 20 percent of the total number of graduations from Soviet higher educational establishments in that year.[80] During the last three decades the Soviet regime has sought to achieve a more equitable geographic spread of its higher educational institutions. Nevertheless, substantial inter-regional differences still continue.

Table IV–57 summarizes official Soviet data on higher education enrollments in the individual union republics in 1940 and 1958, relating

[79] Khrushchev's memorandum on educational reform, in *Pravda*, Sept. 21, 1958.
[80] *Sovetskaia Rossiia*, Aug. 26, 1959.

TABLE IV–57.—*Soviet population, higher education enrollment, distribution of higher education students, and indices of growth by union republic, 1940 and 1958*

Union republics	Population (millions)		Higher education enrollment (thousands)		Higher education students per 10,000 population		Indices of growth[a]
	1939	1959	1940	1958	1940	1958	1940–58
Russian	108.4	117.5	478.1	1,365.7	*44.1	*116.2	*263
Ukrainian	40.5	41.9	196.8	381.1	*48.6	90.9	187
Belorussian	8.9	8.1	21.5	57.0	24.1	70.4	*292
Uzbek	6.3	8.1	19.1	88.2	30.3	*109.8	*359
Kazakh	6.1	9.3	10.4	65.2	17.0	70.1	*412
Georgian	3.5	4.0	28.5	48.2	*81.4	*120.5	148
Azerbaidzhan	3.2	3.7	14.6	36.0	*45.6	97.3	213
Lithuanian	2.9	2.7	6.0	24.4	20.7	90.3	*436
Moldav	2.5	2.9	2.5	16.2	10.0	55.9	*559
Latvian	1.8	2.1	9.9	18.3	10.1	87.1	*862
Kirgiz	1.5	2.1	3.1	15.8	20.6	75.2	*365
Tadzhik	1.5	2.0	2.3	18.2	15.3	91.0	*595
Armenian	1.3	1.8	11.1	19.6	*85.4	*108.9	127
Turkman	1.3	1.5	3.0	12.9	23.1	86.0	*372
Estonian	1.1	1.2	4.8	12.1	*43.6	100.8	231
U.S.S.R. total	190.7	208.8	811.7	2,178.9	42.6	104.3	245

* Higher ratio than U.S.S.R.'s national average.
[a] Higher education enrollment per 10,000 population.
Sources: Enrollment: *NarKhoz–1959*, pp. 831–32. Population: *ibid.*, p. 8. Enrollment figures include extension-correspondence students.

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these to the respective population figures under the 1939 and 1959 censuses. These data reveal an interesting pattern of differences among the republics. The ratios of students per 10,000 of population take into account local population changes over the intervening twenty years and provide an indicator of the relative availability of higher education (and changes therein) in each republic. The last column shows the percentage indices of growth in the respective ratios over the 20-year period. It is particularly striking that while the enrollment ratio for the U.S.S.R. as a whole in 1958 was 245 percent of the ratio in 1940, the growth index for several republics with relatively well-developed higher education facilities—notably, the Transcaucasian republics (Georgia, Azerbaidzhan, Armenia) and the Ukraine—was substantially less than the national index, while the greatest growth in enrollment relative to population took place in the Central Asian and Baltic republics (except Estonia).

Comparison of the enrollment ratios in the various republics for 1958 only reveals that, besides the Russian SFSR, where one would expect to find a relatively high ratio, only three other republics (the Georgian, Uzbek and Armenian SSR's) surpassed the overall U.S.S.R. ratio. All other republics, particularly the Central Asian ones, continued to trail significantly behind the national ratio despite their outstanding gains since 1940. Thus, while there has been a considerable narrowing of the disparities among republics, the enrollment ratios in 1958 indicate that higher educational opportunity continues to be greater in the Russian republic than elsewhere in the U.S.S.R.

The enrollment figures given above represent aggregate enrollments in *all* higher educational programs—full-time day, evening and extension-correspondence. Table IV–58 presents data developed by the author, showing 1956 enrollments in the individual republics broken down into two categories: (1) "regular" (including both full-time day and evening programs); and (2) extension-correspondence. These data suggest that precisely in those republics which enjoyed relatively high rates of growth in their enrollment/population ratios, the proportion of total higher education students enrolled in extension-correspondence programs was greater than the overall national figure. This would seem to point to the conclusion that the high growth rates were achieved to some extent by placing greater emphasis on part-time extension-correspondence rather than regular training.

Despite an increased flow of Soviet statistical information reporting extension-correspondence enrollments by region, a great deal of uncertainty still persists because the methods of reporting are not definitely known. In particular, it is not clear whether the reported enrollment for any individual republic or region represents the aggregate enrollment of all higher educational *institutions located* in that geographic area, or represents the total number of *students domiciled* in the area who are enrolled in higher educational institutions, regardless of location. It appears that the data given in Soviet statistical handbooks (about 20 of which were used in compiling the data used in table IV–58) are based on the first of these methods. The result is that the reported enrollments for big cities, and especially for Moscow where a number of so-called all-union extension-correspondence institutes are located, tend to be exaggerated by the inclusion of substantial numbers of extension-correspondence students residing elsewhere. On this basis, in fact, Moscow has more extension-correspondence than regular full-time students in its higher educational institutions.[81] Of course, this distorts the regional picture only to the extent that students living in one region are enrolled in extension-correspondence programs of institutions located in some other region. The all-union extension-correspondence institutes, which in the late 1950's had an estimated aggregate enrollment of 250,000–350,000 students, are the main source of distortions of this nature.

In any case, the data in table IV–58 indicate that if extension-correspondence students were omitted from consideration, the enrollment/population ratios given earlier for the various republics would be anywhere from 25 to 50 percent smaller. Thus, while the earlier-indicated ratios ranged from 56 (Moldavia) to 120

[81] *Moskva: Razvitie khoziaistva i kul'tury goroda* (Moscow: Development of the Economy and Culture of the City), Moscow, 1958, p. 92. In the fall of 1955 Moscow had 189,000 regular and 220,000 extension-correspondence students. The total, 409,000, is 22 percent of the U.S.S.R.'s total enrollment in higher education.

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TABLE IV–58.—*Composition of Soviet regular and extension-correspondence higher education enrollment by union republic, 1956*

	Total (thousands)	Extension-correspondence		Regular (day and evening)		Sources and notes
		thousands	percent	thousands	percent	
Russian SFSR.....	1,266.7	484.0	38.2	782.7	61.8	*NarKhoz-RSFSR—1957*, 314. *NarKhoz-RSFSR—1959*, 484*.
Ukrainian SSR.....	346.6	106.4	30.7	240.2	69.3	*NarKhoz-Ukrainian SSR—1957*, 449. Derived on the basis of percent for 1955.
Belorussian SSR....	52.3	16.7	31.9	35.6	68.1	*NarKhoz-Belorussian SSR—1957*, 289.**
Uzbek SSR.....	71.5	21.2	29.7	50.3	70.3	*NarKhoz-Uzbek SSR—1957*, 180.*
Kazakh SSR.....	55.2	22.1	40.0	33.1	60.0	*NarKhoz-Kazakh SSR—1957*, 322, 329. Regular students' total derived by addition of enrollments in individual higher ed. est.
Georgian SSR.....	39.9	12.1	30.3	27.8	69.7	*NarKhoz-Georgian SSR—1957*, 274.*
Azerbaidzhan SSR...	34.6	11.2	32.3	23.4	67.7	*NarKhoz-Azerbaidzhan SSR—1957*, 474–75.*
Lithuanian SSR.....	24.0	8.2	34.1	15.8	65.9	*NarKhoz-Lithuanian SSR—1957*, 190.**
Moldavian SSR.....	17.8	7.8	43.8	10.0	56.2	*NarKhoz-Moldavian SSR—1959*, 218.**
Latvian SSR.....	16.2	4.0	24.7	12.2	75.3	*Kul't Stroi-Latvian SSR—1957*, 164.**
Kirgiz SSR.....	14.8	4.9	33.1	9.9	66.9	*NarKhoz-Kirgiz SSR—1957*, 200.**
Tadzhik SSR.....	16.3	7.9	48.5	8.4	51.5	*NarKhoz-Tadzhik SSR—1957*, 337.[a] Derived on the basis of extension-correspondence students in the university.
Armenian SSR.....	20.2	8.7	43.1	11.5	56.9	*NarKhoz-Armenian SSR—1957*, 149, 154.[a] Derived on the basis of first-year admissions to extension-correspondence programs.
Turkmen SSR.....	13.0	4.5	34.6	8.5	65.4	*NarKhoz-Turkmen SSR—1957*, 140.**
Estonian SSR.....	11.9	3.4	28.6	8.5	71.4	*NarKhoz Estonian SSR—1957*, 251.**
U.S.S.R. grand total	2,001.0	723.1	36.1	1,277.9	63.9	Appendix table IV–A–1–S; *NarKhoz—1959*, 830–32. All figures in first column identical with those reported in union republic statistical handbooks.

* States explicitly number of extension-correspondence students. For full titles for all sources, see bibliography.

** States explicitly number of students in both categories.

[a] Estimate of extension-correspondence students for these two republics combined differs by 1,600 from a figure which can be derived as a residual of U.S.S.R. grand total minus the sum of all extension-correspondence enrollments in all republics. This difference (1,600) was redistributed by weights based on total enrollment in each republic. Apparently extension-correspondence figures were withheld in these two republics because they are substantially higher than the national average, indicating that regular higher education is less developed than in other republics.

(Georgia), the omission of extension-correspondence students would result in considerably lower ratios ranging between 35 and 80. In 1958 the United States had an overall ratio of 188 resident students in colleges and universities per 10,000 of population, which was about double the enrollment/population ratio for the U.S.S.R. as a whole, and two to five times the ratios for the various individual union republics.

10. *Soviet Higher Education and the Nationalities Policy*

An analysis of the representation of national minorities in Soviet higher education has been impeded in the past by the absence of statistical information on this subject for the period from the mid-1930's until 1957. The reason for this lack of data was official Soviet secrecy, a policy most evident when nationalities data were suppressed in the 1937 [82] and 1939 censuses of population. For 20 years thereafter, information on the composition of higher education students by nationality was taboo.[83]

After the concept of "root nationality" fell into disfavor in the Soviet Union in the mid-1930's, no clear-cut official criteria of "nationality" were substituted. Official documents and identification papers, such as passports, work books, personnel files, and even Communist

[82] In fact, most of the 1937 census data were declared "invalid."

[83] As is the case with statistics on social origin, Soviet authorities have compiled information on the national composition of higher education students for the last 30 years (see Bukhman, *op. cit.*, p. 20, and reporting form V on pp. 48–49).

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Party cards, recorded the Soviet citizen's nationality on the basis of his own personal declaration, which in turn was based largely on cultural-linguistic factors. The 1959 Soviet population census[84] apparently adhered to this criterion, also indicating whether a person regarded the spoken language of his self-declared nationality as his native tongue.[85]

In 1957, a few years before the release of the 1959 census, the Soviet Government had once again begun publishing official statistics showing the nationality composition of students, graduates and research workers. Soviet statistical handbooks have since included such data for recent years as well as for selected years prior to 1957. These statistics are summarized in appendix table IV–A–7 and the supplement to it.

Soviet propaganda prior to 1957 often sought to picture nationality distribution in higher education simply on the basis of the total enrollment figures for the various individual republics: in other words, the entire enrollment in a given republic, the Ukrainian SSR for example, was depicted to consist of Ukrainian nationals. Thanks to the subsequent release of specific data on nationality distribution of students, it is now possible to check the degree of coincidence or divergence between the geographic and nationality distribution patterns. A comparison of the two for the year 1956 is presented in table IV–59. This comparison is based on "regular" higher education enrollments only (excluding

[84] A preliminary tabulation of the census data, showing level of educational attainment, nationality, sex and age composition of the population, was released in *Pravda*, Feb. 4, 1960.

[85] In 94.3 percent of all cases, the native language coincided with the nationality self-identification. The highest coincidence was for Russians (99.8 percent) and some minor nationalities, and the lowest for Jews (20.8 percent). Over 10,000,000 persons of non-Russian nationality declared Russian their native tongue.

TABLE IV–59.—*Distribution by union republic and composition by nationality of U.S.S.R. regular higher education enrollment, year end 1956*

Distribution by union republic			Composition by nationality			Maximum hypothetical nationality representation in republic enrollments (percent)
Union republic	*A* Total enrollment in local institutions (thousands)	Percentage of total U.S.S.R. enrollment	Nationality	*B* Enrollment by nationality in U.S.S.R. (thousands)	Percentage of total U.S.S.R. enrollment	
Ukrainian	240.2	18.7	Ukrainians	176.6	13.8	73.5
Belorussian	35.6	2.8	Belorussians	34.5	2.7	96.9
Uzbek	50.3	3.9	Uzbeks	24.7	1.9	49.1
Kazakh	33.1	2.6	Kazakhs	16.0	1.2	48.3
Georgian	27.8	2.2	Georgians	22.9	1.8	82.4
Azerbaidzhan	23.4	1.8	Azerbaidzhans	17.4	1.4	74.3
Lithuanian	15.8	1.2	Lithuanians	14.2	1.1	89.9
Moldav	10.0	.8	Moldavians	5.5	.4	55.0
Latvian	12.2	.9	Latvians	9.1	.7	74.6
Kirgiz	9.9	.8	Kirgiz	5.2	.4	52.5
Tadzhik	8.4	.7	Tadzhiks	5.8	.5	69.0
Armenian	11.5	.9	Armenians	22.1	1.6	192.2
Turkmen	8.5	.7	Turkomen	7.7	.6	90.5
Estonian	8.5	.7	Estonians	7.7	.6	90.6
Subtotal	495.2	38.7	Subtotal	367.0	28.7	74.1
Russian Federation	782.7	61.3	Russians	792.1	62.0	101.2
			Other nationalities	118.8	9.3	..
			Among these:			
			Jews	(47.5)	(4.0)	..
			Other national minorities	(71.3)	(5.3)	..
Total	1,277.9	100.0	Total	1,277.9	100.0	100.0

Sources: *Dos-1957*, p. 283; table IV–58 above. Estimates in parentheses of distribution of national minorities and Jews are derived on the basis of RSFSR figures (*KS-RSFSR-1958*, p. 381). See further discussion in the text.

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extension-correspondence programs), and the year 1956 is used because it is the only recent year for which separate figures for "regular" enrollments by individual republic are available.

No explanation is needed regarding the columns comparing the distribution of total U.S.S.R. regular enrollment by nationality against the distribution by republic; however, some elucidation is necessary regarding the last column. The percentages given here represent the relation of the respective total nationality enrollments for the whole U.S.S.R. (column B) to the total enrollments of the corresponding individual republics (column A). The resultant percentages thus show the maximum possible share of total enrollment in each republic which could hypothetically have been composed of students of the local nationality, assuming that all students of that nationality group in the whole U.S.S.R. were enrolled in higher educational institutions within their own republic.

This can be better understood in terms of specific examples from the table. The Kazakh SSR is an extreme example at one end of the scale. The republic in 1956 had a total regular higher educational enrollment of 33,100 students of all nationalities. Since, however, there were only 16,000 students of Kazakh nationality enrolled in regular higher education throughout the U.S.S.R., it follows that no more than 48.3 percent of the 33,100 students in Kazakh republic institutions could have been Kazakh nationals, even if all 16,000 Kazakh students in the U.S.S.R. had been enrolled in the local institutions. At the other extreme, the Armenian SSR had a total 1956 enrollment of 11,500 in regular higher education, as against an overall total of 22,100 Armenian students enrolled in higher educational institutions throughout the U.S.S.R. Thus, the entire 11,500 enrollment in the Armenian SSR could hypothetically have consisted of Armenian nationals, with an additional 92.2 percent enrolled elsewhere in the U.S.S.R.

The only case besides Armenians in which the maximum hypothetical nationality representation factor exceeded 100 percent was for the Russians. In all the remaining republics, the hypothetical percentages ranged from the low of 48.3 percent for Kazakhs up to 96.9 percent for Belorussians, with the rates for Uzbeks, Kirgiz and Moldavians not much higher than that for the Kazakhs. It would seem reasonable to assume that substantial proportions of students of non-Russian nationalities sought higher education outside their native republics, most probably in the RSFSR. In reverse, it may be surmised that Russian nationals accounted for 10–30 percent of the enrollments in most other republics, and possibly close to 50 percent in a number of cases.

These findings are in general agreement with data from various Soviet sources and with the observations of competent foreign visitors to the Soviet Union. In the latter category, Professor Robert Tucker, who accompanied Adlai Stevenson on his journey to Central Asia, reported on the basis of an interview with the Chairman of the Uzbek Council of Ministers that only 50 to 60 percent of the republic's higher educational enrollment was composed of Uzbeks, and the remainder primarily Russians.[86] According to official Soviet sources, of a total of 16,300 students enrolled in higher education in the Tadzhik SSR in 1956–57, 7,400 were Tadzhiks and 2,600 were Uzbeks[87]—a 62 percent proportion of native students. In the Turkmen SSR in the same year, only 4,752 out of a total of 13,045 students in higher educational institutions were Turkmen,[88] representing a proportion of 36 percent. In the Kirgiz republic, the local nationality representation has been even lower: i.e., 20 percent in 1950, and 29 percent in 1957.[89] It should be observed that these actual rates of local nationality representation are all lower than the maximum hypothetical representation percentages computed in table IV–59. This provides further statistical proof that substantial numbers of students of non-Russian nationalities are enrolled in higher educational establishments outside their own republics, and at the same time a substantial proportion of the higher education students in each republic are

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[86] R. C. Tucker, *Impressions of Russia in 1958: A Trip Report*, No. P–1570, Santa Monica: The Rand Corporation, Nov. 30, 1958, p. 34. Note that Russians constitute only 11 percent of the population in the Uzbek SSR.

[87] *NarKhoz-Tadzhik SSR–1957*, p. 336.

[88] *NarKhoz-Turkmen SSR–1957*, p. 140.

[89] *KS–1956*, p. 30; *Sovetskaia Kirgiziia*, Jan. 12, 1958:

	1950	1957
Total enrollment in higher educational establishments	8,600	16,200
Number of Kirgiz nationals	1,682	4,701
Percent of Kirgiz nationals	19.5	29.0

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of Russian rather than local nationality.

Rates of enrollment of local-nationality students in certain republics (particularly the Central Asian) have been traditionally low. In 1932, the proportion of higher education students of local nationality was invariably below 60 percent in the various republics and national regions.[90] Though some improvement has been made in the last three decades,[91] local nationals still lag substantially behind their proportionate share of higher education enrollment.

There are many reasons for this. Most higher education instruction is conducted in the Russian language. The training of specialists of the local nationality is sometimes further handicapped by lack of instructional materials. For example, it has been reported that there are practically no engineering and other technical textbooks in the Uzbek language.[92] Similarly, at Tartu State University in Estonia, textbooks were reportedly lacking in some fields, and in others they were out-of-date. The translation of Russian texts into Estonian cannot satisfactorily fill the vacuum, and Russian scholarly periodicals cannot replace the needed Estonian language journals.[93] In the Kirgiz SSR during the three-year period 1955–57, about 1,000 students of local nationality were forced to drop out of higher educational institutions, in a majority of cases because of "lack of knowledge of the Russian language."[94] Behind these difficulties, of course, are basic policy considerations, which have been aptly summed up by an American student of Soviet nationality policies:

> Perhaps the most significant indication of the present Soviet rulers' views on the nationalities question is their failure to carry out cultural reforms. By returning to the minorities the relative cultural and linguistic autonomy which they enjoyed in the 1920s and lost under Stalin, the regime could have strengthened the national identity of these groups without in any way weakening the foundations of Communist power. But nothing of the sort has happened. The policy of cultural Russification initiated by Stalin is still in full force.[95]

The policy of cultural Russification, which is particularly evident in higher education and is reflected in the low representation of local nationalities in student enrollments, is related to another fundamental problem. There is perhaps no more controversial subject in Soviet higher education than the administrative measures which have, in effect, set up a directly discriminatory system of nationality quotas to be applied in selecting candidates for admission to higher education.

During an interview which took place in July 1958 between a group of 40 visiting American students and Deputy Rector Vovchenko of Moscow State University, the latter was asked whether there were any quotas in the U.S.S.R. for the admission of students to higher education. Vovchenko replied: "None, except for [preference to] some national groups who lack the necessary complement of intelligence. For instance, the Yakut Autonomous Republic is now creating its own university, and we help them by training their graduate students."[96] This statement is a typical Soviet official denial of the existence of preferential quotas, except to encourage more extensive higher education among "certain national minority groups." In reality, such denials are outright falsehoods. Soviet higher educational establishments, and especially those located in the major centers of learning such as Moscow and Leningrad, have nationality and geographic distribution quotas, which are explicitly fixed by the Ministry of Higher and Secondary Specialized Education. In order to save officials from embarrassment, these quotas are guarded carefully as "state secrets."

It is known that from the very inception, in the early 1930's, of the planning system for the training of professional personnel there existed so-called "inter-regional balances" governing admissions of new students and the placement of graduates.[97] This was tantamount to a system of geographic and nationality quotas, and was openly discussed in the early 1930's. But be-

[90] *Za promyshlennye kadry* (monthly), No. 3–4, 1932, p. 24.

[91] It is difficult to look upon the Soviet method of reporting as anything but a propaganda technique. It is the growth factor (in 1932 there were *x* nationals, but by 1957 there were *y* many more than *x*) which is singled out, and the numbers are not related to the population of a given nationality, an approach which would give strikingly different rates of national representation.

[92] *Pravda vostoka*, Sept. 4, 1957.

[93] *Sovetskaia Estonia*, Jan. 31, 1957.

[94] *Sovetskaia Kirgiziia*, Nov. 4, 1957.

[95] R. Pipes, "The Nationalities," *The New Leader* (Russia 5 Years After Stalin series, No. 4), Apr. 14, 1958, 18.

[96] K. Geiger, "Notes on Trip to the U.S.S.R., July 13–Aug. 20, 1958," p. 4 (mimeographed report for private circulation).

[97] *Plan Kadrov—1930*, esp. pp. 158–204.

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cause the Soviet Government subsequently adopted a policy of suppressing comprehensive statistics on social origin, nationality and geographic origin, it was not possible to ascertain, except vaguely, the sizes of the quotas even though they were definitely known to be still in force. The continued existence of a quota system has in fact been reconfirmed by recent travelers to the Soviet Union who had intimate contacts with Soviet citizens. (These sources are not specifically cited here in order to protect the identity of their Soviet informants.) Furthermore, the Soviet press itself has furnished clues indicating the existence of such quotas.

The deputy chairman of the Council of Ministers of the Lithuanian SSR, for example, complained recently that "we have to petition the Ministry of Higher Education of the U.S.S.R. to increase the present quota of Lithuanian students permitted to enter higher educational establishments in Moscow and Leningrad from 40 to 100 entrants per year."[98] Such statements are by no means rare and provide ample evidence of the existence of quotas. They do not, however, shed any light on what the quotas actually are and how they operate to the advantage or disadvantage of specific regions and nationalities.[99]

For instance, we know that the admission quotas of higher educational establishments in the Transcaucasian republics are to be kept "at par" with the 1957 level through the remaining years of the Seven-Year Plan (1959–65).[1] If, at the same time, the geographic quota for the admission of Transcaucasians to higher educational establishments outside these republics remains unaltered, then this restriction would seem to put those seeking higher education in the three republics at a substantial disadvantage.

It is in the context of these considerations that we have to approach another controversial topic in this discussion, i.e., the relative position of the Jewish population and its opportunities for higher education. The Western press has published numerous accounts by travelers to the Soviet Union who reported receiving first-hand information of widespread discrimination against the Jews, including restriction of their access to institutions of higher learning. This information has to be viewed first of all in the context of the general problem just discussed—namely, the existence of geographic and nationality quotas in Soviet higher education.

A fundamental question that poses itself is whether any quota system based on such criteria can be just. The answer is obviously in the negative on both moral and practical grounds, at least from the standpoint of Western democratic ideals. However, given the fact that a system of admission quotas does exist in the U.S.S.R., the problem then becomes one of ascertaining whether and why it does, in fact, operate to the particularly severe disadvantage of the Jewish population. Again, reliance must be placed upon anonymous informants who state that the Soviet authorities use the so-called principle of "equivalent balance" as a guide in fixing nationality quotas, which means simply that the representation of any national or ethnic grouping in overall higher educational enrollment should be kept at approximately the same percentage level as the relation of the size of that group to total U.S.S.R. population. Thus, as explicitly stated by the Soviet authorities, those nationalities whose higher educational development "ought to be fostered" get preferential admission quotas, while those who are "over-represented" are curtailed accordingly. In view of the fact that profound urban-rural, republic and national differences in the level of educational attainment persist in the U.S.S.R., it is obvious that "equivalent balance" quotas can be highly discriminatory particularly as regards specific institutions or specific fields of study.

Table IV–60 summarizes Soviet data on the composition of the total Soviet population by nationalities as of 1926 and 1959, together with the distribution by nationality of total U.S.S.R. enrollment in regular higher education in 1935 and 1958. On the basis of these data, indices of national representation have been computed for two years, 1935 (column C) and 1958 (column H), and column I shows the number of students of a given nationality per 10,000 of population as of 1958. Between 1935 and 1958, the index

[98] *Sovetskaia Litva*, Mar. 17, 1959.

[99] Prior to 1958 the Ministry of Higher Education was one of the agencies studying the "dynamics of the training of national cadres" (i.e., what number of nationals are being trained) and "planning" how many should be trained. Since 1958 the Central Statistical Agency supposedly collects and analyzes such data for the entire U.S.S.R. (Bukhman, *op. cit.*, p. 38).

[1] *Uchitel'skaia gazeta*, May 16, 1958 (Eliutin).

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of representation rose for most nationalities, but fell for Georgians and all national minorities, with a very drastic decline for the Jews. In 1958, six nationality groups (Russians, Georgians, Lithuanians, Armenians, Estonians and Jews) had an index of national representation in higher education in excess of 100 percent, while all other nationalities trailed with indices of 70 to 80 percent despite substantial threefold to fourfold gains over the period of the mid-1930's.

The important consideration here is Soviet official policy. If the Soviet authorities really aimed at attaining "equivalent balance," then they would appear to have achieved some success, since the indices of nationality representation in 1958 show considerably greater evenness than those of the mid-1930's. This is, of course, a cumulative process of raising the general level of educational attainment in various regions of the U.S.S.R. The discrepancy between the proportion of a given nationality grouping in the total population and the proportion of students of that nationality in total higher educational enrollment has been narrowed. Abstractly, this "optimum" provides normative justification for the way in which

TABLE IV–60.—*Soviet population and higher education enrollment by nationality and index of national representation, 1935 and 1959*

Nationality	1935			1958–1959					
	Distribution of Soviet population, 1926 census (percent)	Distribution of higher education students fall 1935 (percent)	Index of national representation (ratio B/A in percent)	U.S.S.R. population 1959 census (millions)	Distribution of U.S.S.R. population in 1959 (percent)	Regular enrollment fall 1958 (thousands)	Distribution of regular enrollment in 1958 (percent)	Index of national representation (ratio G/E in percent)	Higher educational enrollment per 10,000 population (F over D)
	A	B	C	D	E	F	G	H	I
Russians	52.9	54.4	103	114.6	54.9	824.9	61.9	113	72.0
Ukrainians	21.2	14.3	67	37.0	17.7	183.6	13.8	78	49.6
Belorussians	3.2	3.0	94	7.8	3.6	35.4	2.7	75	44.9
Uzbeks	2.7	.5	18	6.0	2.9	28.9	2.2	76	48.2
Kazakhs	2.7	.4	15	3.6	1.7	19.7	1.5	88	54.7
Georgians	1.2	3.5	292	2.6	1.2	23.1	1.7	141	88.8
Azerbaidzhans	1.2	1.3	108	2.9	1.4	18.3	1.4	100	63.1
Lithuanians	.....	.....	.....	2.3	1.1	15.5	1.2	109	67.4
Moldavs	.....	.....	.....	2.2	1.1	6.0	.4	36	27.3
Latvians	.....	.....	.....	1.4	.7	9.6	.7	100	68.6
Kirgiz	.5	.1	20	1.0	.5	5.8	.4	80	58.0
Tadzhiks	.7	.1	14	1.4	.7	6.7	.5	71	47.9
Armenians	1.1	2.3	21	2.8	1.4	21.2	1.6	114	75.7
Turkomen	.5	.1	20	1.0	.5	5.7	.4	80	57.0
Estonians	.....	.....	.....	1.0	.5	7.4	.6	120	74.0
Subtotal	87.9	81.0	92	187.6	89.9	1,211.8	91.0	101	64.6
Other nationalities	12.1	20.0	165	21.2	10.1	121.2	9.0	89	57.2
Among these:									
Tatars	2.0	1.3	65	6.0	2.8	(a)	.....	.....	.....
Jews	1.8	13.3	739	2.2	1.1	b(53.3)	4.0	364	242.3
Germans	.8	.7	87	1.6	.8	(a)	.....	.....	.....
Chuvash	.8	.5	62	1.5	.7	(a)	.....	.....	.....
Poles	.5	.7	140	1.4	.7	(a)	.....	.....	.....
Mordvins	.9	.3	33	1.3	.6	(a)	.....	.....	.....
Bashkirs	.5	.2	40	1.0	.5	(a)	.....	.....	.....
All other nat. minorities	4.8	3.1	65	6.2	2.9	b(67.9)	5.0	56	35.7
Total enrollment (thousands)	.....	563.0	.....	.....	.....	1,333.0	100.0	.....	63.8
Total population (millions)	147.0	.....	.....	208.8	100.0	.....	.....	.....	.....

[a] Included among all other minor nationalities.
[b] Estimated on the basis of weights in the RSFSR national representation.

Sources: Appendix table IV–A–7; Lorimer, *Population*, pp. 55–61. The 1959 population from Soviet census report in *Pravda*, Feb. 4, 1960.

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quotas are applied by the Soviet authorities, but it avoids the real issue as to whether it is socially desirable or morally just.

While total regular enrollment more than doubled and the numerical enrollments of most nationalities effected an increase in their representation index, the actual number of Jewish students declined from 74,900 in 1935 to 53,300 in 1958.[2] The setting of admission quotas undoubtedly penalized the Jewish population, with its significant urban concentration and higher level of educational attainment, more heavily than other minor nationality groups with more diversified occupational and rural-urban distribution. These tendencies, of course, have to be considered separately from acts of explicit discrimination against the Jewish population, such as the barring of Jews from jobs and access to special kinds of education on "security grounds" —i.e., especially from positions as Soviet diplomatic and trade representatives abroad and in the officer corps of the Soviet armed services.

Soviet propaganda often underscores the fact that on an enrollment/population basis (i.e., column I of table IV–60), Soviet Jews continue to enjoy a substantial lead in access to higher education over other Soviet nationalities, including the Georgians, Armenians, Russians, and Estonians. This is a cover-up for the discriminatory practices arising from the official policy of "optimum national representation." The nationality quotas which are in operation in the Soviet Union are but another example of the overall quota system by specialty, by branch, by geographic region and by proportion of new students with "work experience," which are omnipresent in the Soviet educational system. All of these measures tend to discriminate against the individual who desires to obtain education of his own choosing on the basis of his personal merit and ability. While the Soviet state has lessened the factor of economic discrimination, it has created a host of other discriminatory administrative policies. The state decides what the social optimum in the supply and selection of students shall be in any given field. Discrimination based on nationality is just another governmental roadblock in the way of individual preference and choice, and as such it is an indispensable consequence of the communist system of a planned society.

[2] Table IV–60 and appendix table IV–A–7. In 1935 Jews accounted for 13.3 percent of the total number (563,000) of regular students; in 1958, 4 percent. Note that this does not take extension-correspondence enrollment into account, since such statistics by national composition have not been released.

The Placement of Soviet Professional Graduates

Soviet higher education is centrally planned and theoretically produces enough graduates annually to satisfy the demand in various sectors of the economy. In practice, however,

> The planning organs still do not have well-developed research methods for determining the future demand for specialists in the national economy. At the present time this type of planning is conducted in a primitive way: the plans are made up on the basis of requests (*zaiavki*) by ministries and departments which frequently do not correspond to the actual situation. Thus very often a totally inadequate number of specialists are trained for such fields as the technology of machine building, metal-cutting tools and instruments, industrial and civil construction, radio engineering and many others.[3]

Similarly, the Deputy Minister of Higher and Secondary Specialized Education, M. A. Prokofiev, stated: "In some branches of industry the training of specialists exceeds the demand, but in others—particularly those related to new technology—the demand is not satisfied."[4]

In order to cope with the shortage of specialists, the Soviet Union has relied extensively upon centralized procedures for placing higher education graduates in the course of the last few decades.[5] According to Soviet law, since 1933 all specialists graduating from Soviet higher educational establishments are assigned to jobs which they must stay on for at least 3 years.[6] The original decree (never revoked) has been reinforced by other regulations (in 1936, 1937, 1940, 1948 and 1956) aimed at restricting the occupational mobility of graduates outside the specialty of their formal training and stipulat-

[3] *Pravda Ukrainy*, Oct. 25, 1959.

[4] *VVSh*, No. 10, Oct. 1959, p. 81.

[5] For a discussion of this problem within the broad context of Soviet labor recruitment and labor mobility, see M. K. Roof, "Recent Trends in Soviet Internal Migration Policies," *R.E.M.P. Bulletin*, Vol. 8, No. 1 (Jan./Mar. 1960), 1–18.

[6] *VyShkoSPR–1948*, pp. 208–12; *VyShkoSPR–1957*, pp. 203–11; *Sbornik zakonodatel'nykh aktov o trude* (Collection of Laws Concerning Labor), Moscow, 1958, pp. 80–86.

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ing the involuntary placement of higher education graduates. In 1940, when labor legislation acts were reinforced through the introduction of labor books (without which an individual cannot be hired anywhere), the opportunity for specialists to change jobs at will was even further reduced. During the period 1940-56 professional graduates, as well as other workers and employees, were subject to criminal prosecution for quitting (or changing) jobs without prior authorization from the management of the employing unit, and also for tardiness or absenteeism without valid reason. In April 1956 this law was repealed,[7] thus easing somewhat the restrictions upon job mobility (although the labor books and the involuntary placement of graduates are still in force). By the same token, the repeal of the law has added new problems for the planners concerned with the placement of professional graduates.

The procedure for the personal placement (*personal'noe raspredelenie*) of higher education graduates is presently as follows.[8] Several months prior to graduation, the U.S.S.R. Ministry of Higher and Secondary Specialized Education (or a corresponding job assignment unit) sends to higher educational establishments a roster of jobs (*plan raspredeleniia spetsialistov*) to which its graduates should be assigned. Several steps are involved in this centralized placement procedure.

Various prospective employing units—enterprises, offices, research organizations, etc.—send requests (*zaiavki*) for a certain number of graduates to the appropriate economic administration (originally ministries and now regional economic councils), which in turn send them to the U.S.S.R. State Planning Committee's division on specialized personnel for transmittal to the Division on the Planning of Training and Placement of Graduates of the U.S.S.R.'s Ministry of Higher and Secondary Specialized Education. This latter division determines which institution should "satisfy" each request and issues to it the appropriate placement order accompanied by the original request. From this point on, direct contact is established between the unit requesting graduates and the individual higher educational establishment which has received the order, and a representative of the employer is usually put on the placement committee of the higher educational establishment.

Occasionally, a slightly different procedure is followed. The request for graduates may come to the higher educational establishment directly from the prospective employer. In such a case, the request must still be approved by the placement division of the Ministry and all interested parties notified (i.e., the State Planning Committee, regional economic council, etc.).

This placement procedure is applicable to all Soviet universities, socioeconomic higher educational establishments and engineering institutes. The placement of medical graduates is handled through the Division of Specialized Personnel of the U.S.S.R. Ministry of Public Health; agricultural specialists are cleared through the Division of Specialized Personnel of the U.S.S.R. Ministry of Agriculture; pedagogical graduates have a separate clearing unit—ministries of education—in each of the 15 republics.

Individual higher educational establishments set up committees on placement (*komissiia po personal'nomu raspredeleniu*) each spring, consisting of the director (rector), several other officials, representatives of the appropriate trade union, the Young Communist League and the Communist Party, and, usually, representatives of the economic administration and/or individual enterprises concerned. This committee examines the record of each prospective graduate and acquaints him in a personal interview with various details about the job for which he is being considered.[9] Before an "offer" is made, the committee chairman may ask the student for his views as to his qualifications for a particular kind of job and where he would prefer to work, which may or may not be taken into consideration. Thereafter, a simple majority vote determines the placement of each graduate. If the student is dissatisfied with the decision, he may petition for reconsideration, but if his appeal is rejected, the decision becomes final. "The disagreement of the young specialist with

[7] *Direktivy KPSS i sovetskogo pravitel'stva po khoziaistvennym voprosam* (Directives of the CPSU and the Soviet Government concerning Economics), Moscow, 1958, vol. 4, pp. 620–26.

[8] *VyShkoSPR—1957*, pp. 206-10.

[9] Occasionally, a roster of jobs is posted on a bulletin board and the students may acquaint themselves with the possibilities and express their preferences during the interview.

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his job appointment by the committee on personal placement does not free him, upon graduation, from his duty to report to work in accordance with the placement order." [10] Until 1956, as noted, disobedience of such orders could have resulted in criminal prosecution; other disciplinary measures are currently in force. The graduate is given his assignment papers (*putevka*) within ten days after receipt of his graduation diploma, although the employing unit gives him a month's "vacation" before he reports for work. In theory, no person may be hired for a professional job without a placement order unless he has a "permit for self-placement." [11]

"Self-placement permits" are routinely issued to graduates who are physically disabled; who support a disabled parent or other disabled member of the immediate family; to women graduates who are wives of military personnel; pregnant women graduates; women graduates with very young infants; and to husbands or wives graduating simultaneously with their spouses who wish to be placed together. Such permits may also be issued by the placement committee if it has exhausted all the jobs on the roster and some graduates have yet to be placed.

Ideally, then, each graduate is placed by an individual institution after clearance from a central authority in accordance with national planning. A Soviet professional graduate does not choose his own job, but is rather chosen for it. Unless he has a self-placement permit he cannot be legally hired, nor may he change jobs voluntarily until he has served the 3-year period required. In practice, however, the placement procedure does not run this smoothly. One flaw is that a complete roster of jobs is often not available on time.[12] Another is that informal "arrangements" through friends or relatives may determine the placement of the graduate rather than the committee formally set up for this purpose.

Job opportunities vary according to field. A group of Soviet engineering exchange students reported the situation as follows as of 1958–59. The number of jobs listed on the placement roster usually exceeds by a considerable margin the number of engineering graduates. In petroleum engineering (the Moscow Institute of Petroleum Engineering was cited) there were about eight jobs per graduate; in electronics engineering (the Moscow Power Engineering Institute), seven jobs per graduate; in nuclear engineering (the Mendeleev Chemical Technology Institute in Moscow), 20 jobs per graduate; and in computer technology (also the Moscow Power Institute), 40 jobs per graduate. These ratios may seem extremely high, but are conceivably in line with the elite engineering schools to which the figures apply.

The students felt that there was a "real" choice of jobs, that one could always get "a" job, but that it took "brains" to get a better one. Most students, they said, try to make job arrangements before graduation by establishing "good contacts" while they are taking their industrial practice or through friends working in a desirable place. They may solicit letters from plant directors or officials from research institutes recommending them for employment to the placement committee. Such letters would refer to positions listed on the official roster of prospective jobs. Thus a resourceful student would find the job he wanted listed on the placement roster; and once the institute announced the listing, the students joked, it was the "early bird who catches the worm." Once the student has secured a favorable job for himself, he should stop "shopping around" lest someone else get the job he has arranged for. If this happens and he is assigned to a job which he does not particularly like, he would have to "work it out" (*otrabotat'*) for 3 years at least. After that "one would always change jobs anyway," one of the students remarked, a remark followed by laughter by the others.

Such an account may not be exaggerated: the Soviet press has also reported that some of the students, especially from elite schools, do their own recruiting:

Certain enterprises send their representatives to our higher educational establishments. They arrive long before the placement committees begin their work and start recruiting graduates. . . . Some students

[10] *VyShkoSPR—1957*, p. 207.

[11] National statistics on the number of graduates given "self-placement permits" are not usually made public. In 1956, however, of 2,027 graduates of Moscow State University, 302 persons, or about 15 percent of the total, were given self-placement permits or "free diplomas" (*svobodnyi diplom*) (MGU, *Otchet . . . 1955–56*, p. 17).

[12] *Pravda*, June 4, 1959.

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listen to them and when the time comes, they don't even want to hear the placement committee about a job. . . . Such "pushers" do immeasurable harm . . . to the moral education of the students. . . .[13]

Another problem, evidenced since 1956 particularly, has been that graduates often refuse the jobs assigned to them, particularly if they are in provincial towns[14] or rural areas,[15] and simply "don't show up." There are a number of devices used to get out of the job assignment, among them marriage. Of one graduate of a pedagogical institute in Moscow, her father said: "[She] got married . . . . This marriage is just make-believe. As soon as she gets an assignment to one of the schools in Moscow, she will get a divorce."[16] Some students will try "all possible tricks in order to remain in the cities where they studied, even at the cost of not working in the specialty for which they were trained."[17] The Minister of Higher and Secondary Specialized Education of the Russian SFSR has declared that while there has not been "mass refusal" on the part of students to take the jobs assigned to them, there was indeed a "real practical problem."[18] He stated further:

We have a law which states that every graduate who completes higher education must work on an assigned job for 3 years. This law has not been repealed. . . . It is a just law. . . . Improved moral education should reduce the number of refusals to take the [assigned] jobs. We do not feel that recourse to the criminal prosecution, which has now been lifted, will work better than moral persuasion.

A campaign has been launched in recent years against "persons with a diploma, but without a conscience."[19] In addition, some of the educational reform measures are designed to curtail the urge of Soviet higher education graduates "to find a cozy place."[20] In fact, it has even been suggested that the graduation diploma not be issued until the graduate had been employed for three years and has secured "suitable character references that he has proven himself a dependable professional specialist."[21]

Physical Plant and Other Facilities in Soviet Higher Education

An attempt to analyze the availability of training facilities in Soviet higher education is not wholly successful because in most instances detailed data are not available.[22] Appendix table IV–C–1 provides information on the total number of institutions of higher education in the U.S.S.R. from before the Revolution until 1959.[23] The number of institutions, according to official statistics, was 190 in 1929, but 579 only one year later and 701 just two years later. Obviously, it was impossible that this many new facilities, in terms of actual physical plants in particular, could have been constructed in this particular 2-year period, and the "growth" was an artificial one, in name only, achieved by splitting up individual institutions into a number of "new" units. Some large engineering schools were divided into a dozen specialized institutes, or departments of universities became separate institutes. Accounts by Soviet refugees claim that there were instances when several "new" institutes were actually housed in the same building, but on different floors.

This artificial growth continued until 1934, though some genuinely new facilities had been set up in the period under discussion. In 1934 there was a consolidation of some of the existing institutions, and since then the additions of new units have in most instances been genuine new facilities, buildings, laboratories, etc. Nevertheless, for the last 30 years, reports con-

[13] *Izvestia*, Dec. 10, 1959. Another account has complained that the student's "papa" or "uncle" decides what job he shall take. (*Komsomol'skaia pravda*, Aug. 11, 1959.)

[14] See *Sovetskaia Litva*, Nov. 25, 1956; *Kazakhstanskaia pravda*, Apr. 16, 1957; *Kommunist Tadzhikistana*, Nov. 30, 1957; *Kommunist* (Armenia), Oct. 10, 1958.

[15] See *Sovetskaia Moldaviia*, Mar. 22, 1957, Feb. 24, 1959; *Sovetskaia Rossiia*, Mar. 25, 1958.

[16] N. I. Boldyrev, *O moral'nom oblike sovetskoi molodezhi* (Concerning the Moral Outlook of Soviet Youth), Moscow, 1954, p. 27. See a similar story in *Sovetskaia Estonia*, Feb. 17, 1960.

[17] *Pravda*, June 4, 1959.

[18] Speech by Stoletov in Kaz'min, *op. cit.*, p. 127.

[19] *Komsomol'skaia pravda*, July 4, 1959, contains a story about some of the "tricks" employed by the graduates of the first-rate Bauman Higher Technical School to remain in Moscow.

[20] *Sovetskaia Estoniia*, July 16, 1958.

[21] *Izvestia*, Dec. 10, 1959.

[22] Such information is compiled internally, but has not been publicly released. Each year higher educational establishments report on floor space used in various instructional activities, libraries, dormitories, workshops, etc. See Bukhman, *op. cit.*, p. 21 and forms for such reports in *VyShkoSPR–1957*, pp. 536–38.

[23] See also appendix tables IV–C–2 and IV–C–3 for a breakdown of institutions by branch and specialty group, and discussion in text above.

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cerning shortages of facilities have still been more numerous than reports of new facilities, with the situation particularly bad in the 1930's and also after the postwar expansion of enrollments.

Aside from some spectacular ventures, most notably Moscow State University,[24] which has drawn high praise from Western visitors as "far in excess of anything done in the United States,"[25] there are still shortages and inadequacies, especially in comparison with the overall facilities in the United States and Western Europe. It is impossible to ascertain what actual additions have been made in terms of new physical plants in the last few decades. Some institutions undoubtedly have added new buildings, laboratory facilities, and dormitories, but others are still housed in old buildings (often converted from other use), some of them erected long before the Revolution. World War II undoubtedly wiped out many of the physical plants in occupied areas, and about 1,200,000 square meters of instruction space and 800,000 square meters of dormitory space were reportedly destroyed. How much has been rebuilt is not known, but most institutions in existence in the prewar period are reported as "operating" in the postwar years.

Table IV–61 provides official Soviet statistics on capital outlays for construction, maintenance and purchase of equipment in higher education in the 1950's. The proportion of funds devoted to these purposes ranged from 10 to 13 percent of the total higher education budget.[26] In theory, this would allow about 100 medium-sized buildings to be erected annually at a cost of at least 5,000,000 rubles each.[27] But if the much higher cost of such projects as the Moscow

[24] The estimated construction cost of the new buildings is upwards of two billion (old) rubles. The main building was erected between 1949 and 1953, and new buildings surrounding it are still going up.

[25] E. H. Litchfield, *et al., Report on Higher Education in the Soviet Union,* Pittsburgh: University of Pittsburgh Press, 1958, p. 16.

[26] By comparison, in the United States at least 10 percent of the total higher education budget is devoted annually to new construction. See D. M. Keezer (ed.), *Financing Higher Education: 1960–70,* New York: McGraw-Hill, 1959, pp. 83, 253.

[27] *VVSh,* No. 4, Apr. 1951, p. 7. The construction cost of an average-size instructional building—for higher education, or a technicum—with floor space of about 2,500 square meters and volume about 50,000 cubic meters was about 5,000,000 rubles in the early 1950's, estimated on the basis of a construction (replacement) cost of 100 rubles per cubic meter (L. Potekhin *et al., Planirovanie raskhodov na soderzhanie uchrezhdenii prosveshcheniia i zdravookhraneniia* [Planning of Expenditures for Maintenance of Educational and Public Health Establishments], Moscow, 1955, p. 113). This is likely a minimal average cost.

TABLE IV–61.—*Capital expenditures on new buildings, maintenance and equipment, in relation to the total budget for Soviet higher education, 1950–57*

[In million current rubles]

	1950	1951	1952	1953	1954	1955	1956	1957
Capital expenditures on new construction	275.1	421.7	577.3	618.6	696.4	554.4	500.7	600.2
Capital repair and maintenance of existing plant	169.8	172.6	165.1	183.5	184.5	182.7	215.4	230.8
Expenditures for teaching and laboratory equipment and related items*	340.0	197.9	192.5	247.2	268.5	204.9	306.6	324.0
Expenditures for office equipment	69.3	77.0	80.1	90.5	70.1	78.1	89.3	92.4
Total, physical plant and equipment	854.2	869.2	1,015.0	1,139.8	1,219.5	1,020.1	1,112.0	1,257.4
Total state budgetary expenditures on higher education	7,209.8	7,522.1	8,158.0	8,852.2	9,716.6	10,205.0	10,723.0	11,105.8
Percent of total on plant and equipment	11.8	11.5	12.4	12.8	12.5	10.0	10.5	11.3

* Includes tools, instruments, glassware, utensils; and also uniforms.

Source: Ministerstvo Finansov SSSR, *Raskhody,* p. 57.

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State University buildings is taken into account, it is obvious that the number of facilities actually built would be much smaller.

Most visitors to the Soviet Union in the late 1950's are in agreement that the existing facilities are overcrowded. For instance, according to a British report:

> The use of the buildings for full-time courses in two shifts is evidence of their overloaded condition, but their original spaciousness enables them to carry the overload without excessive congestion in corridors and circulating spaces. The standard of building and accommodation, particularly in the older institutes, was poor, in marked contrast to Moscow University. . . . Maintenance of the buildings was distinctly poor. . . . The many lecture rooms were simply furnished and obviously had had extremely hard use.[28]

In laboratory equipment, the report stated, "there is far from being a uniform national standard, the engineering quality and instructional value of equipment varying from very good to very bad, depending to some extent upon the age of the institute and quality of staff. . ."[29]

An American report similarly concluded that:

> It is an understatement to say that the buildings provided for the *VTUZ's* [engineering-higher educational establishments] are in general of poor quality by American standards. Housing of all types is critically short throughout the U.S.S.R. . . . Under these circumstances, many of the *VTUZ's* are housed in very old buildings, the state of repair of which leaves much to be desired. Plumbing and electrical facilities are very noticeably poor. Lighting, generally, is much less than adequate. Limitations of space result in excessive crowding, ...[30]

These opinions of Western visitors are not in disagreement with those of Soviet authorities themselves. In 1959 Minister Eliutin admitted that facilities were in many instances inadequate,[31] and a Soviet survey found:

> The physical plant and facilities of most higher educational establishments and semiprofessional schools continue to be most unsatisfactory and obviously call for increased expenditures for improvement in the near future.[32]

[28] *Engineering Education in the Soviet Union*, report of a team of engineers who visited Russia in the autumn of 1956, London: Unwin Bros., Ltd., 1957, p. 11.
[29] *Ibid.*, p. 16.
[30] *ASEE*, p. 865.
[31] See *Pravda*, Feb. 4, 1959.
[32] Komarov, *Ekonomicheskie osnovy*, p. 138.

Teaching Personnel in Soviet Higher Education

The supply and, particularly, the qualifications of teachers are important determinants of the quality of higher education. Chapter V is devoted specifically to a discussion of the training and supply of Soviet academic and research personnel. This section will deal with teaching staffs in higher educational establishments only,[33] particularly in relation to enrollments.

1. *Procedures for Making Academic Appointments*

For over a century before the Communist Revolution there were competitive provisions for filling academic jobs in Russia.[34] Each Russian university, though government-financed and operated, enjoyed autonomy in the selection of its professional staff, either by its academic senate or individual departments. The Soviet regime, however, introduced a different procedure. Although individual institutions may recommend persons to fill specific academic jobs, the Supreme Attestation Commission, the *VAK*, has centralized control over most such appointments. In essence, this has deprived individual institutions of their autonomy and power to make staff appointments final.[35] While they may still select and recommend persons for such appointments, the *VAK* itself makes the appointment to all senior academic rank positions (professors and associate professors) and must certify the appointment of junior personnel (teachers and instructors).

Each spring various higher educational institutions announce that there will be competition (*konkurs*) for positions in the fall. There are two types of competition, one for vacant positions (*vakantnye dolzhnosti*) and the other for staff positions which are already filled (*zame-*

[33] See summary data on higher education staffs in appendix table IV–D–1; and also as a component of *RAP* in appendix table V–B–1.
[34] See Johnson, *Russia's Educational Heritage, passim*. These provisions date back to the University Charter of 1804 and were included in the subsequent charters of 1835, 1863, and 1884 in one form or another.
[35] Prior to the establishment of the *VAK* in the late 1930's, control over academic appointments rested with "qualification commissions" (*KK*) or "teaching qualification commissions" (*PKK*), of the various economic administrations (commissariats) in charge of different groups of higher educational establishments.

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shchennye). The competitions are open to qualified persons and notice of them is given in newspapers or scholarly periodicals,[36] which indicate which type of competition is to be held and what fringe benefits (i.e., housing availability) are associated with the appointment. The most important consideration (aside from the type, reputation and location of the institution) is which type of competition is to be held. Until 1953 competitions were held only for vacant positions. Since then, a decree has been in effect whereby each staff position is open to competition every 5 years,[37] and elaborate procedures for conducting the competitions have been set up.

A person wishing to enter the competition, whether he is already on the staff of the institution involved or employed elsewhere, submits to the institution's director a special petition, accompanied by a variety of documents—record of previous jobs held, *VAK* certificates of candidate or doctor degree or of academic appointment if appropriate, copies of his research and publications, an autobiography, plans for special research if any, and references from previous employers.[38] The academic council (director, deans, senior professors, departmental chairmen) of the institution sets up a special board to examine these records and to give an opinion of the applicant's qualifications. The special board's power is limted to recommendation. It is the academic council which decides, by secret ballot, the suitability of each applicant (even those not recommended by the special board). A successful applicant is recommended to the director of the institution for a specific academic position,[39] who usually makes a "provisional" one-year appointment (called *Ispolniaiushchii obiazannosti—IO*, "performing the duties of a professor" [associate professor, etc.]), and submits the prospective appointee's documents to the *VAK*. If the appointment is to junior rank, the *VAK* simply certifies it, and it is valid for 5 years until new competitions are held. If the appointment is to senior rank, however, the *VAK* examines the records carefully and, if satisfied, itself not only makes the actual appointment but also issues a formal "accreditation certificate" to that effect. Thus the *VAK* has veto power over any "competitively" elected faculty member, as well as retroactive power to cancel such appointments. Although competitions for each position are held every 5 years (in this sense there is no academic tenure), appointments to senior academic positions are considered "permanent" in terms of certification, and persons holding such rank have a decided, if not insurmountable, advantage over other contestants for the same position, as well as for other higher-ranking positions if they decide to compete for them, either at the same or another institution. Similarly, although competitions are held for academic administrative positions—departmental chairmen, division heads, deans and their deputies—these also can be filled only with the approval of the *VAK*. Directors (and university rectors) of all higher educational establishments are selected by the Ministry of Higher and Secondary Specialized Education directly, with concurrent clearance of such appointments through the "nomenclature of the Central Committee of the Communist Party."[40]

In sum, individual Soviet higher educational institutions may express their preference every 5 years for candidates for academic positions which may be "filled" or vacant, but the final decision rests with the central personnel office, the *VAK*. A person who fails in the competition or who succeeds in the competition but fails to secure approval by the *VAK* is "relieved" of his job (if the competition is for a position which he holds), although if he holds senior academic rank, he may still retain his "title." He is free, however, to enter other competitions.

There have been a number of complaints about the operation of this system,[41] the substance of which is that it is decidedly partial to

[36] Especially trade or education newspapers, such as *Uchitel'skaia gazeta, Promyshlenno-ekonomicheskaia gazeta, Trud, Stroitel'naia gazeta.*

[37] *VyShkoSPR—1957*, pp. 303–05.

[38] Until 1956 there were two types of such references: one given to the person himself, the other a "confidential reference" which was sent directly from the previous place of employment to the secret section (*sekretnyi otdel*) of the institution where the person was seeking employment. Since 1956 the latter has been "prohibited" (*VyShkoSPR—1957*, p. 302).

[39] A person may not compete for more than one appointment at the same institution.

[40] For a general discussion of "nomenclature" procedures, see ch. VI.

[41] See, especially, *VVSh*, No. 4, April 1958, pp. 67–69; *Vestnik Leningradskogo Universiteta* (Journal of Leningrad State University), No. 9, 1954, pp. 104–17; *Sovetskoe gosudarstvo i pravo* (Soviet State and Law), No. 1, 1957, pp. 74–82.

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senior academic rank holders, who usually are automatically "reelected" every time. Persons already holding appointment at a given institution who fail in the competition do so not because they are not good teachers or otherwise are less qualified but because of unpleasant "personal relationships" with the administration. Dismissal from the job of unsuccessful competitors often results in protracted court litigations[42] brought by the unsuccessful competitors on the grounds that the competition was "irregular"; hence unless there is a clear-cut case of a substantially superior person, academic councils hesitate to "elect" persons from outside the home institution. "Real" competition exists only when the position is already vacant (i.e., it is either newly established or its previous holder has resigned or died). Finally, it is argued that the competitions strengthen the staffs of the "better," centrally located institutions and have the effect of "unloading" poorly qualified persons upon the weaker (usually provincial) institutions.

2. *Definition of Teaching Staff and Multiple-Job Holders*

The problem of ascertaining the actual number of teachers in Soviet higher education is extremely complicated because the statistics, which refer to the total number of research and academic personnel (*RAP*), include both "staff personnel" (*shtatnye*) and multiple-job holders (*sovmestiteli*).[43] The latter are persons holding two or more jobs or academic appointments. Various decrees have specified that persons may hold only one staff appointment but several teaching posts.[44] *Sovmestitelstvo,* or multiple-job holding, was particularly common in the late 1920's and early 1930's when teachers for higher education, as well as specialists in various professional fields, were in short supply. It has continued, though on a diminishing scale, up to the present time. In short, staff members of one institution may hold one or more teaching appointments in other institutions, or other jobs in research or industry. Similarly, holders of research or industrial jobs may also hold teaching appointments. This phenomenon is not of course peculiar to the Soviet Union, but in other countries it probably exists on a more limited scale.

In 1959 the Council of Ministers of the U.S.S.R. issued another decree aimed at curtailing multiple-job holding in general and specifically at teaching personnel who held jobs simultaneously in two or more educational establishments. Several types of activities were not classified as infringing upon this decree, and thus it was not forbidden, for example, to hold a teaching and administrative post concurrently, or to supervise research either in the institution where one was teaching or on the outside.[45] In the summer of 1960 another decree was issued which again permitted multiple-job holdings in a number of teaching areas—medicine, pedagogy, semiprofessional schools and preschool institutions. Also exempt from the multiple-job holding restrictions were all activities of research and academic personnel which called for hourly compensation rates (consultations, membership on expert commissions, editorial assignments, etc.). In addition, multiple-job holding by persons hired from the "outside" (i.e., mainly from industry) to teach in higher educational and semiprofessional establishments was also allowed though a maximum of 240 hours per academic year was stipulated. Thus the drives to curtail multiple-job holding have either not been successful nor pushed to conclusion, partly because of the shortage of qualified personnel and the desire to make maximum use of specialists in particular fields.

In order to clarify this somewhat, let us consider the situation in 1946.[46] In that year there were about 67,300 staff appointees. In addition, there were 7,100 teachers with multiple appointments, 2,400 of whom held jobs in research establishments and 4,700 of whom worked in industry and public administration. Thus the total number of persons employed as teachers

[42] On January 31, 1957, the Supreme Soviet ratified a law prohibiting court litigations in case of dismissals of academic personnel as a result of competitions (Fed'kin, *Pravovye voprosy,* p. 269), though discussions concerning the rights of academic personnel under the Soviet labor laws continue. Aside from court litigation, academic personnel have the right of administrative appeal.

[43] Summary data on higher education staffs are presented in appendix table IV–D–1. See also the general discussion of this problem in regard to research and academic personnel in ch. V.

[44] *VyShkoSPR–1948,* p. 471 ff; *VyShkoSPR–1957,* p. 352 ff.

[45] *SSO,* No. 8, 1960, pp. 63–64.

[46] See Sinetskii, *PP Kadry,* pp. 105–06.

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was 74,400. Out of the total number of 67,300 staff appointees, there were in turn 7,800 persons who had jobs in more than one institution and 13,400 who held additional jobs in research establishments, industrial enterprises or government. Thus, 21,200 of the staff appointees in higher education were also employed elsewhere. To sum up, there were 67,300 staff appointees, 7,800 of whom had two or more teaching appointments. In addition, 7,100 teachers were assigned from the outside. Therefore, 74,400 *actual* persons were engaged in more than 82,200 jobs. Furthermore, out of the total 74,400 actual persons, 28,300, or well over a third, held more than one job.

Multiple teaching appointees are sometimes called part-time teachers, but this term is somewhat ambiguous. The instruction load of a teacher who has one job and of a teacher who has several jobs may be identical in a given higher educational establishment, while the total workload in the case of the latter is obviously greater. Consequently, as far as the teaching load alone is concerned, both single- and multiple-job holders may be in the same category. A staff appointee gets his full salary in one place, and, in addition, up to 50 percent of it from every other job. Except for this salary arrangement, there is often no way of telling, from the point of view of time input, who is a full- or part-time teacher, or whether a person is employed in a higher educational establishment, in industrial enterprise, in government, or in a combination of these.

One fact seems clear, however, concerning multiple-job holding. A professor can get so involved in it that his value as an effective teacher can diminish drastically (a consequence not uncommon elsewhere as well). In fact, a major target of criticism by the Soviet press is that professors holding more than one job cannot devote the desired individual attention to their students. At the same time, however, multiple appointments are commended because of the more extensive and effective utilization of the best teaching or most experienced scientific talent. In this connection, it might be noted that higher-ranking appointees show increasing proportions of multiple-job appointments.[47] This has been a consistent tendency in the past, and the data for Moscow State University indicated in table IV–62, if taken as typical, indicate that it continued in the 1950's.

TABLE IV–62.—*Total teaching staff of Moscow State University: staff and multiple-job holders as of the academic year 1955–56*

Rank	Total	Staff	Multiple-job holders	
			Number	Percent
Professor	265	159	106	40.0
Associate professor	601	515	86	14.3
Instructor (senior and junior)	427	394	33	7.7
Assistant	432	406	26	6.0
Research associate (senior and junior)	533	530	3	.6
Total	2,258	2,004	254	12.5

Source: MGU, *Otchet*, p. 15.

Contrary to what one might expect, however, multiple appointments are far more frequent in nonscientific fields. The areas of jurisprudence and the arts have the highest proportion (up to 60 percent) of multiple appointments, while in engineering only about 30 percent of staff appointees hold more than one job. Large urban centers, with their concentration of research establishments and higher educational institutions, account for the greatest number of multiple-job holders.[48]

Data on the composition of Soviet higher education staffs by rank are available for only two postwar years, as shown in table IV–63. The data indicate a marked conservatism in appointment to senior academic rank, with almost three-quarters of the total number in the two years under consideration not holding such rank. This conservatism is further reflected by the declining proportion of professors among the total between 1947 and 1955.[49]

3. *Teaching Load*

The practice of multiple-job holding is closely related to the workload of Soviet teachers in higher education. It was decreed in 1937 that

[47] *Ibid.*, p. 171.

[48] *Ibid.*, pp. 172–74.

[49] See discussion of a similar development for all *RAP* in ch. V.

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TABLE IV–63.—*Composition of Soviet teaching staffs, by academic rank, 1946 and 1955*

	1946		1955	
	Total number	Distribution in percent	Total number	Distribution in percent
Senior rank holders:				
Professors	[a]5,527	8.2	6,129	5.2
Associate professors	13,863	20.6	25,000	21.0
Nonrank holders:				
All other teachers and instructors	47,890	71.2	87,830	73.8
Total	67,280	100.0	119,059	100.0

[a] Includes 157 academicians.
Source: Sinetskii, *PP Kadry*, pp. 116, 122; *KS–1956*, p. 249. See also text table V–16.

staff members work a *minimum* of 36 hours during a 6-day work week,[50] or "approximately 1,440 hours per calendar year (i.e., about 40 work weeks per academic year)."[51] At the same time, the *maximum instruction load* was specified as 18 hours per week, or up to about 760 instruction hours per year. Senior rank appointees have fewer hours (550-600), and lower rank appointees up to the maximum. This provision refers to both single- and multiple-job holders. The Soviet definition of "instruction load," however, includes all sorts of instructional activities and is not limited to actual classroom instruction. Besides lectures, it includes seminars, individual consultations with students, and other such academic activities. The definition is thus broad enough to include all sorts of activities which require face-to-face contact between teacher and student on an individual or group basis. Thus, the teaching load as commonly defined in American educational practice is less than the specified maximum 18 hours per week in the Soviet Union (overloading notwithstanding in the case of multiple-job holders).

The remaining weekly time (36 hours minus not more than 18 hours) is to be spent on "other duties," such as preparation for lectures, research, grading, preparation and correction of examinations, and staff seminars. Some of these activities, such as research, are planned in advance for the entire academic year, while others, such as preparation for lectures, are dictated by prevailing needs and are left to the teacher's discretion. Often additional jobs, especially among upper-rank appointees, are carried at the expense of these latter activities.

[50] For various decrees and regulations concerning this, see *VyShkoSPR–1948, passim*, and *VyShkoSPR–1957*, pp. 358–61.
[51] *Uchitel'skaia gazeta*, Oct. 10, 1959.

4. *The Growth of Teaching Staffs by Branch and in Relation to Enrollment*

As indicated by the data in table IV–64, increases in teaching staffs in different branches of Soviet higher education were very uneven during the period between 1929 and 1946. This disproportionality becomes more striking if the increments in enrollment are compared with the increases in teaching staffs, as is done in table IV–65.

TABLE IV–64.—*Distribution of teaching staffs, by branch, 1929, 1940 and 1946 (excluding multiple-job appointees)*

Branch	1929	1940	1946
Engineering	3,200	12,400	18,800
Agriculture	2,200	5,500	6,700
Socioeconomic	300	1,500	2,600
Educational-cultural	6,500	19,400	24,700
Health	1,300	10,300	14,100
Total	13,500	49,300	66,900
Unaccounted	200	800	800

Source: Sinetskii, *PP Kadry*, p. 108.

TABLE IV–65.—*Comparison of rate of growth of students and teaching staffs, 1929–46*

Branch	Increase in enrollment (ratio 1946 to 1929)	Increase in teaching staff (ratio 1946 to 1929)
Engineering	3.2	5.9
Agriculture	1.8	3.0
Socioeconomic	1.7	8.7
Educational-cultural	4.4	3.8
Health	5.2	10.8
All branches	3.4	5.0

Source: Ratio of growth of enrollment computed from appendix table IV–A–1–E. Ratio of growth of teaching staffs from Sinetskii, *PP Kadry*, p. 108.

From 1929 to 1946, overall teaching staffs increased more rapidly than enrollment. In the educational-cultural branch, however, the re-

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verse was true. While in the health branch the teaching staff increased more than twice as much as enrollment, in engineering and agriculture the increment in teaching staff over the enrollment was only 1.8 and 1.6, respectively. Apparently the branches of agriculture and engineering were not so well off as the health branch in solving their teacher problems, although the rate of increase in teaching staffs was substantially greater than the increment in enrollment. Despite the large number of students in education, for example, less priority is assigned to such areas and as a consequence fewer qualified academic appointees were assigned to them.

The expansion in enrollment which took place after 1947 resulted in less favorable differential rates of growth of teaching staffs to enrollment. During the last 30 years regular enrollment increased by a ratio of 9.8, while teaching staffs (including multiple appointees) increased about sixfold. Unfortunately, data are lacking to make detailed comparisons of teaching staffs by branch after 1947.

5. *Size of Total Teaching Staffs and Student-Teacher Ratios*

Appendix tables IV–D–1, V–B–1 and V–B–2 give data on the size of teaching staffs in Soviet higher education as part of the total number of research and academic personnel (*RAP*). Table IV–66 summarizes such data in relation to enrollments and also gives student-teacher ratios for the period 1927–59. The 1927 figure for teaching staffs represents the actual number of persons engaged in higher education teaching, but for all subsequent years the figures also include varying proportions of multiple-job holders.

Student-teacher ratios, in relation to aggregate enrollment (i.e., including evening and extension-correspondence students) have deteriorated more or less steadily over the last three decades, from about 7:1 in 1931 to 16:1 in 1959. If only full-time enrollment is considered, however, the ratios have shown much less fluctuation during the period, with the minimum ratio of 7.3 students per teacher in 1931 and the maximum of 9.6 in 1955. In the fall of 1960 the

TABLE IV–66.—*Higher education enrollments, total teaching staffs, and student-teacher ratios, 1927–59*

Year	Enrollment		Aggregate teaching staffs[a] (thousands)	Student-teacher ratio	
	Aggregate total (thousands)	Full-time (day) only (thousands)		Total enrollment	Full-time (day) enrollment only
1927..	159.8	159.8	16.4	9.7	9.7
1929..	204.2	204.2	22.9	9.1	9.1
1931..	430.0	430.0	58.2	7.3	7.3
1940..	812.0	558.0	60.0	13.2	9.1
1947..	964.0	705.0	81.5	11.8	8.6
1950..	1,247.0	818.0	87.0	14.4	9.5
1953..	1,562.0	995.0	105.4	14.8	9.4
1955..	1,867.0	1,147.0	119.0	15.7	9.6
1959..	2,267.0	1,146.0	137.8	16.5	8.4

[a] Including multiple job holders.
Sources: Appendix tables IV–A–1–S, IV–A–1–E, IV–D–1.

aggregate teaching staff in Soviet higher education was 146,900,[52] and thus in relationship to enrollment (aggregate—2,396,000; full-time day —1,156,000), the student-teacher ratios improved somewhat: 16.3:1 for aggregate enrollment and 7.9:1 for full-time day enrollment.

The student-teacher ratios are considerably higher, however, if only full-time staff appointees are counted. Information on "regular" (day and evening) enrollment and full-time staff appointees is presented in table IV–67.

TABLE IV–67.—*Regular enrollment, full-time teaching staffs, and student-teacher ratios, 1927–54*

Year	Regular (day and evening) enrollment (thousands)	Faculty staff only (thousands)	Student-teacher ratio
1927.....	159.8	16.4	9.7
1929.....	204.2	13.8	14.7
1931.....	430.0	26.2	16.4
1940.....	558.0	50.9	11.2
1946.....	649.0	67.3	9.7
1950.....	818.0	80.0	10.3
1954.....	1,147.0	86.0	13.2

Sources: Appendix tables IV–A–1–E and IV–D–1.

Thus it is evident that the year 1931, for which the student-teacher ratio on the basis of total

[52] *SSSR–Tsif–1960*, p. 315.

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staff (including multiple-job holders) was the lowest (7.3:1), actually was the worst year when the ratio is computed for full-time enrollments and full-time staff (16:1). The years 1927 and 1946 had the most favorable student-teacher ratios (9.7:1). The aggregate teaching staffs have increased gradually in recent years (1955—119,000; 1960—147,000); but it seems significant that information on the number of multiple-job holders has not been released since 1954. From the data available, however, it seems obvious that the limited size of teaching staffs places real constraint upon the expansion of full-time enrollments.

The current reforms in the instruction program are aimed at making more extensive use of the staffs available. The same is true of facilities. The current shift to part-time higher education, as well as a numerical growth in enrollment, can thus be achieved without a proportionately increased investment in staff or facilities. While this course may have some negative repercussions upon the quality of Soviet higher education, they may be offset by the fact that a relative abundance in the supply of professional manpower has already been obtained by the regime and by the intentions of the planners to safeguard the quality of education in certain strategic fields of engineering and science by excluding them from the general requirement of part-time education with concurrent full-time employment.

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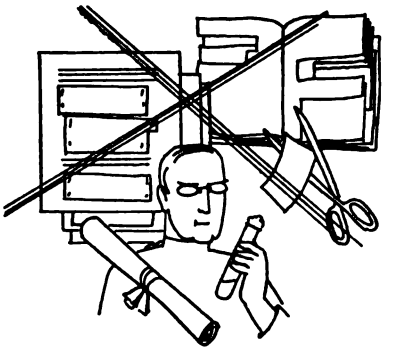

CHAPTER V

Advanced Degrees and Soviet Research and Academic Personnel

In all modern industrial societies the extent and quality of professional higher education and of the entire research effort in science, technology and other fields depend to a large degree upon the numbers and quality of the personnel engaged in academic teaching and research. The present chapter is devoted to a discussion of this most highly trained segment of Soviet manpower—academic and research personnel, scholars and scientists. It deals with the types of programs used in the Soviet educational system to prepare these people, with the quantitative dimension, distribution of effort by field, quality indicators, and, finally, patterns of employment and utilization of this personnel in Soviet research and academic establishments.

Advanced Research Training and Degrees

Soviet graduates of higher educational institutions are regarded as sufficiently qualified to enter professional work in a given specialty. However, those who already are or will be engaged in research activity or in teaching in higher education have the opportunity to take advanced training and to be awarded one or both of the two Soviet academic degrees. The lower of these is called the Candidate Degree (*Kandidat Nauk*); the higher is the Doctor Degree (*Doktor Nauk*).

There are two distinct aspects of advanced training and teaching-research activity in the Soviet Union. On the one hand, they are characterized, as anywhere else, by individual endeavor; but on the other, they are simultaneously subjected, unlike anywhere else, to close conformity to and integration with the overall research objectives of the Soviet Government. In the latter case, Soviet advanced degree training represents an integral part of day-to-day scientific or technological, basic or applied research, and in an individual research effort may represent only a small fraction of an extensive research program.

Soviet universities and other higher educational establishments offer professional training which may be compared with our undergraduate education. This training in some instances may be more extensive than our own, but in others may trail behind. In some scientific and engineering fields it approaches our training programs for the first professional degree, though narrow specialization prevails. In the Soviet case, however, no actual academic degrees are granted; those who complete such training receive diploma certificates. The advanced degrees of candidate and doctor are the only academic degrees conferred in the Soviet Union.

For the sake of convenience, Soviet advanced degree training is sometimes called "graduate" or "postgraduate" study, but these terms are largely misnomers if we think of them in the

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way they are used in the American educational setting. It is true that only those who have been graduated from Soviet higher educational establishments may enter advanced degree programs, just as our advanced degrees may be sought only after undergraduate education. Here the resemblance ends, and little can be gained by applying American terminology to the Soviet situation. The more relevant consideration is how Soviet advanced degrees are awarded and what function they have.

As there is no standardized meaning to advanced degrees in American higher education, so there are even less uniform criteria to apply to Soviet advanced degrees. The only useful purpose served by an effort to equate the two is convenience in numerical comparisons. Aside from this, the attempted use of equivalents merely creates further confusion in trying to understand Soviet advanced degree programs.[1]

It is probably correct to say that candidate degrees in the U.S.S.R. and Ph.D.'s and other doctorates in the United States serve a similar functional purpose: establishing formal criteria of an individual's qualifications to engage in some sort of advanced research or teaching. In the United States academic degrees above the bachelor level are often held to be prerequisites for teaching or research careers. In the Soviet Union, however, an advanced degree is usually concomitant with such teaching or research. It may be granted either early in the career or, more frequently, after prolonged tenure in a teaching or research rank. Soviet advanced degrees thus serve as *supplemental* criteria of performance.

It must be emphasized first that advanced degrees in the Soviet Union may either be "earned" as a result of training or awarded for certain accomplishments without formal training. Those who enter advanced training are considered to be "aspiring" (and hence the words *aspirantura* and *aspirant* for the training program and student, respectively) toward research or teaching careers, in which an advanced degree represents a certain level of accomplishment, helpful in securing status or academic rank appointment but not an essential prerequisite. Quite the contrary situation is more common: the advanced degree is awarded *after* appointment to teaching or research rank.

Secondly, it should be kept in mind that Soviet advanced degrees may be earned not only in regular higher educational establishments, which offer the regular professional training programs, but also in research institutes, which do not engage in ordinary professional training. These research institutes or laboratories are under the jurisdiction of the Academy of Sciences of the U.S.S.R., the republic academies of sciences, academies of a particular branch of science, or industrial research institutes.[2] During the period 1934–46 the Academy of Sciences of the U.S.S.R. accounted for about 20 percent of all the advanced degrees awarded; the republic academies, about 10 percent; industrial research institutes and branch academies, 10 percent; and higher educational establishments, 60 percent. In the postwar period a similar distribution has continued, with higher educational establishments still accounting for about two-thirds of all advanced degrees conferred.[3]

Soviet advanced degrees may be granted on two bases: (1) for a dissertation based on research; (2) for other research work instead of a dissertation. In contrast to American practice, in which individual institutions determine the awarding of advanced degrees and appointment to academic rank, in the Soviet Union the actual confirmation of advanced degree awards, as well as appointment to academic and research positions, is made by a central office, the Supreme Attestation Commission (*VAK—Vysshaia Attestatsionnaia Komissiia*).

The current procedures for obtaining ad-

[1] The Massachusetts Institute of Technology study of Soviet science education (Korol, *Soviet Education*, especially pp. 390–94) has argued the point eloquently and at great length that the Soviet candidate degree may, or may not, be on a par with the American Ph.D. or doctorate in science. There is no way of "proving" or "disproving" such a comparison, and it is largely a matter of judgment. For every "excellent" thesis in a Soviet institution of learning one could find a score of inferior dissertations in the United States, and vice versa. The lowest-quality Soviet candidate degree probably does not amount to more than the U.S. master's degree or even the Ph.D. of a third-rate American university. The better quality of candidate degrees would doubtless rank with United States Ph.D.'s and doctorates in science. Soviet doctor's degrees cannot be compared to American advanced degrees in any meaningful way whatever.

[2] In 1960 there were 541 higher educational establishments and research institutes which engaged in advanced training leading toward the candidate degree. Of this total, about half were higher educational establishments and half, research institutes. (*VVSh*, No. 3, Mar. 1960, p. 5.)

[3] See appendix table V–A–1.

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vanced degrees may be summarized as follows:[4]

1. *Aspirantura training* may be undertaken by those who begin careers in teaching in higher educational institutions or in research, and who intend to qualify for the candidate degree. The aspirantura program gives special, individual training to those who wish to prepare for the candidate qualification minimum (*kandidatskii minimum*) examinations, or, simply, candidate examinations.

2. *The candidate degree* is awarded either to persons who complete aspirantura training, subsequently pass the candidate examinations, and publicly defend a thesis; or to assistant professors, associate professors, professors, or senior research associates who may not have have taken formal aspirantura training. In the latter case, the candidate degree is usually awarded after the candidate examinations have been passed and public defense of a dissertation has been made; but occasionally it is given on a merit basis for outstanding work, without examinations or thesis defense.

3. *The doctor degree* may be awarded either to those who have a candidate degree or to those with the rank of professor who lack a candidate degree. It too may be awarded either after public defense of a dissertation or on the basis of the past performance and scholarly merit of the recipient. Outstanding publications or unpublished research reports may be regarded as equivalent substitutes for a dissertation.

From 1937 until 1956 there was also in existence a *doktorantura* training program, the doctor degree counterpart to the aspirantura program. Individual study was undertaken by those with a candidate degree who wished to engage in research and study preliminary to writing a doctoral thesis. This program has now been abolished.

Soviet Academic and Research Personnel—RAP

What kind of persons make up this highly trained manpower? The Russian language has various terms for them: research workers (*nauchnye rabotniki*), research collaborators (*nauchnye sotrudniki*), research personnel (*nauchnye kadry* or *nauchno-issledovatel'skie kadry*), research and teaching personnel (*nauchno-pedagogicheskie kadry*), professorial-instructor personnel (*professorsko-prepodavatel'skie kadry*), etc. All these Russian terms lack precision for our purposes. They are used individually or in combination as generic definitions of persons who are engaged in teaching or research in either higher educational institutions or research establishments. Teaching or research, or both, may be coupled with administrative activity; and all of these activities—teaching, research, and administration—may take place in any field of knowledge: the humanities, sciences, arts, etc.

All persons employed in such positions hold an academic appointment in a higher educational establishment or a research appointment in a research establishment, or both. However, once a person has been certified in an advanced academic rank or has obtained an advanced degree, he is then included in the category of "research worker" regardless of place of employment. This is a recognition of the fact that Soviet academic ranks and advanced degrees are closely interrelated indices of individual research and academic performance; and though a person may be employed in an industrial enterprise, government administration, or in the military establishment, his certification of advanced academic rank or advanced degree is "permanent" in the sense that it places him in the category of "research worker."[5] Furthermore, many persons with an advanced academic rank or degree, even if employed outside higher educational or research establishments, may be multiple-job holders and continue to work there too.

The most common translations of *nauchnyi rabotnik* are "scientific worker," "scientific associate," and even "scientist." The Russian word *nauka* is commonly and conveniently mistranslated as "science." Actually, *nauka* has the meaning of "knowledge" and can be applied with broad connotation to any field of knowledge, advanced teaching or research activity—

[4] Various regulations concerning procedures may be found in *VyShkoSPR—1957*, pp. 280–377; and Akademiia Nauk SSSR, *Nauchnye kadry SSSR* (Research Personnel in the U.S.S.R.), Moscow, 1959, esp. pp. 9–35, 167–70, 193–213.

[5] There are cases where such certification may be revoked, however. See discussion of the *VAK*'s functions, below.

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the humanities and fine arts as well as the physical sciences, medicine or engineering. Thus, in discussing advanced personnel in Soviet higher education and research organizations, not "science" exclusively, but all fields of knowledge must be considered. For purposes of the following discussion, several other terms must be clarified.

One of these is the abbreviation *RAP*, which stands for research and academic personnel. It is this kind of personnel which the Russians mean by the term *nauchnye rabotniki*. *RAP* thus includes all individuals who have advanced degrees and academic or research rank titles. There are also many persons counted as *RAP* who do not have advanced academic degrees but are engaged in teaching or research. All persons who have one or both advanced degrees and/or an academic or research rank appointment are counted as *RAP* even if they are not employed in higher educational or research establishments.[6] This reporting practice is followed probably as a matter of convenience, for the *VAK* keeps track of these personnel regardless of where they are employed in the economy. The *VAK* is responsible for maintaining the national register or personnel file, in which data are kept on every person to whom it has granted advanced degree accreditation and/or academic or research appointment title. Any job transfer of *RAP* is thus automatically reported to the *VAK*. As of October 1960, there was an aggregate total of 354,200 *RAP*, 200,100 of whom worked in research establishments, 146,900 in institutions of higher learning, and 7,200 elsewhere in the national economy.[7] Personnel records were kept on each of these people by the *VAK*.[8]

Soviet authorities distinguish 18 different fields of knowledge by which *RAP*, as well as candidate and doctor degree holders, may be classified:[9]

I. *Physical sciences*
   1. Physics and mathematics
   2. Chemistry
   3. Engineering
   4. Geology-mineralogy

II. *Biological sciences*
   5. Biology
   6. Agriculture
   7. Medicine
   8. Pharmacy
   9. Veterinary medicine

III. *Social sciences and humanities*
   10. Geography
   11. History
   12. Economics
   13. Philosophy (and political science)
   15. Jurisprudence
   16. Pedagogy
   17. Arts (fine and performing)
   18. Architecture

In addition, the fields of physical culture and military and naval science are designated for candidate degree holders only.

In addition to the classification of *RAP* by field of knowledge, persons with advanced degrees (*uchenaia stepen'*), i.e., either candidate or doctor, and persons holding academic rank (*uchenoe zvanie*) are classified as follows:[10]

(A) *In higher education* (primarily)
   1. Professor (*professor*)
   2. Associate professor (*dotsent*)
   3. Assistant professor, lecturer-instructor (*assistent, prepodavatel'*)

(B) *In research establishments* (primarily)
   1. Professor (*professor*)
   2. Senior research associate (*starshyi nauchnyi sotrudnik*)
   3. Junior research associate (*mladshyi nauchnyi sotrudnik*)

Among these categories of academic and research ranks the titles of professor (A–1, B–1), associate professor (A–2), and senior research associate (B–2) are awarded directly by the *VAK* and are viewed as senior ranks. Appointment as assistant professor and junior research associate (A–3, B–3) is made by individual teaching

[6] As will be shown below, however, the proportion of *RAP* outside of academic and research institutions is only about 4 percent of the total.

[7] *SSSR–Tsif–1960*, p. 315; *Pravda*, Jan. 26, 1961. For a historical trend in the number and composition of *RAP*, see appendix table V–B–2 and discussion in text below.

[8] There is reason to believe that the *VAK*, not in its degree-accrediting role but in its capacity as a national register of all advanced teaching and research personnel, has other, "unmentionable" functions related to Soviet security agencies, secret police, and military mobilization outlets. It is officially stated that the *VAK* has "other" duties, but they have never been spelled out.

[9] *VyShkoSPR–1945*, pp. 187–244, gives definitions of the fields of study as they were established in December 1939. A 1934 decree on advanced ranks and academic degrees singled out 16 fields of study. Two fields were added in 1937. The definitions have remained the same ever since, and the 1959 classification of fields, with the individual specialties included within each, may be found in Akademiia Nauk SSSR, *Nauchnye kadry SSSR*, pp. 39–148.

[10] *VyShkoSPR–1957*, pp. 308–43.

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or research institutions with subsequent confirmation by the *VAK*.

Historical Development of Procedures for Advanced Training, Academic Degree Awards, and Advanced Appointments

Prior to 1917, the system of advanced degrees and advanced training which existed in Russia was patterned closely after that in Germany. Shortly after the Revolution, on October 1, 1918, a governmental decree of the Council of People's Commissars abolished all academic ranks and advanced degrees.[11] Academic distinctions and ranks were viewed as survivals of capitalist inequality and hence were to be permanently eliminated. However, advanced training programs which had some resemblance to advanced training of the prerevolutionary era were put in operation. Prior to 1925, advanced training was in the form of "professorial scholarships" (*professorskie stipendiaty*), which meant in effect that promising students, upon completion of higher education, were selected to stay on for further study and research in a given department of the university. These students were considered to be preparing for academic careers.

After 1925, such personal selection and guidance of promising students was formalized into an advanced training program known as *aspirantura,* a name it still bears today. A student who had been selected as a likely candidate for a teaching or research career came to be known as an *aspirant*.

Faced with enormous shortages of scientific and teaching manpower when the forces of industrialization were set in motion in 1929, Soviet higher educational authorities began expanding aspirantura training very rapidly through the wholesale assignment of industrial research personnel to it, often in complete disregard of whether the aspirant had previously completed his higher education or otherwise possessed the necessary qualifications. A decree of September 19, 1932, terminated this practice, and specified that only qualified graduates of higher educational institutions could enroll for advanced training. Selection was to be made by the appropriate departments of higher educational establishments. In addition, all research institutes, whether under the jurisdiction of industrial commissariats or of the U.S.S.R. Academy of Sciences, began programs whereby some of their staff members guided young people through a 2- or 3-year individual program of advanced study and research, following which the student was to prepare a dissertation. Still, no advanced degrees were granted.

On January 13, 1934, a very significant decree was issued,[12] specifying the establishment of several academic ranks and two advanced academic degrees and outlining the procedures of appointment to the former and award of the latter. It also recognized some degrees earned prior to 1917 in Tsarist Russia and elsewhere. The 1934 decree, supplemented by further regulations in 1937, 1938, and 1939, provided the basis for the Soviet advanced degree training and research program now in effect. The numerous other regulations introduced since then have merely clarified and amended various aspects of advanced training without substantially altering its basic procedures.

In the mid-1930's many persons actually employed as professors, associate professors, and senior research associates obviously did not have advanced degrees since there had been none awarded prior to 1934 and those awarded before the Revolution were not recognized. These persons were considered to possess the highest qualifications as scholars and scientists. Since advanced degrees could not be granted overnight, a solution was found whereby those who were full professors were said to have the "qualifications" of a "doctor," though in order to acquire a doctorate they had to prepare and publicly defend a dissertation or submit other work in its stead. Similarly, associate professors and senior research associates were considered

[11] A. I. Demenev and N. S. Dobrovol'skii, *Vysshee obrazovanie na Urale* (Higher Education in the Urals), Sverdlovsk, 1958, p. 33.

[12] This is one of the most important decrees concerning appointment to academic rank and the award of advanced academic degrees. It can be found in *Svod zakonov SSSR* (Collection of Laws of the U.S.S.R.), Moscow, No. 5, 1934, p. 30, and the supplement which interprets this law in *ibid.*, No. 54, p. 270. Additional details concerning the award of degrees, appointment to academic rank, etc. may be found in *VyShkoSPR—1945* and *1948, passim,* and *VyShkoSPR—1957,* pp. 280–351.

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to possess the "qualifications" of a "candidate," though, again, in order to acquire the candidate degree they also had to defend a dissertation.

In addition, both doctor and candidate degrees could be awarded without defense of a dissertation on the basis of merit, that is, for inventions, discoveries, or "outstanding" work or research. In recent years the practice of conferring degrees on the merit basis has apparently diminished. In 1938 the Supreme Attestation Commission, or *VAK*, was established as the central and sole authority for making decisions on academic appointments and the award of degrees.[13] Such centralization was essential in order to justify the existing differentiation by rank of research and academic personnel who already had their appointments. It was also essential for giving new academic appointments to those who did not have advanced degrees.

The *VAK*, one of the chief divisions of the Ministry of Higher and Secondary Specialized Education, is vested with the authority to confirm, deny, or revoke advanced degrees and academic rank appointments, to determine in which disciplines and at which institutions advanced training may be undertaken, and to publish instructions and information pertaining thereto. In its certification function the *VAK* solicits the judgments of expert commissions on the quality of the research and academic performance of applicants recommended by the various higher educational and research establishments for advanced degrees and academic rank, and on the relative quality of departments and faculties for the purpose of supervising advanced degree training.[14] Thus the *VAK* acts as the integrator of individuals into state-directed programs for developing the most advanced trained manpower of the country. This powerful function is unique, since it distinguishes Soviet advanced degree training from its counter-part anywhere else in the Western world: it establishes centralized control over all types of advanced personnel.

[13] The *VAK* replaced a score of "qualification commissions," known as *KK* (*Kvalifikatsionnye Komissii*), which had jurisdiction over appointments to academic rank and research positions prior to that time. Most of these commissions were temporary and had jurisdiction over a given field of science or a given set of research or academic institutions.

[14] *VyShkoSPR—1948*, pp. 419–20.

Aspirantura Training and Candidate Degree Award Procedures

Aspirantura training today is considered the basic means of preparing new teaching and research personnel for the higher educational establishments and research institutions of the U.S.S.R. Although aspirantura training and the award of candidate degrees are treated together in Soviet sources, it must be borne in mind that the completion of aspirantura training does not necessarily result in the award of the degree. Similarly, many candidate degree holders have not taken aspirantura training.

Formal aspirantura training is an individual program conducted under the supervision of senior academic or research personnel. In theory it leads to the qualifying examinations for the candidate degree and to the preparation and defense of a dissertation. In practice, a large proportion of aspirantura students complete the training program and are thus certified, but do not actually obtain the candidate degree.

Aspirantura students are selected from among applicants under 35 years of age [15] on a competitive basis. The program lasts 3 years. Applicants must have a completed higher education in the field in which they wish to specialize, must have demonstrated an aptitude for research, and must have had (with certain exceptions) research, teaching, or industrial experience for at least 2 years in the particular field they intend to work in as aspirants.

Until 1957, honor students—the top 2–3 percent of the graduating class—could, on the recommendation of the higher educational establishment from which they had been graduated and if they passed the required entrance examinations, be admitted directly to aspirantura training in the fall following their graduation. Since then, however, the fields in which persons may be admitted to advanced degree training immediately upon the completion of higher education have been determined annually by the Ministry of Higher and Secondary Specialized Education or by the Academy of Sciences of the U.S.S.R. Fields available to

[15] The revision of the aspirantura admission rules and training set-up of June 1957 lowered the age limit from 40, which had been the cut-off age until then. (See *VyShkoSPR—1957*, pp. 618–21.)

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students immediately upon graduation included, in 1959 and 1960, mathematics, physics, mechanics, astronomy and theoretical fields of chemistry and biology.[16] In all other cases, a person must have worked for at least two years in the field of his proposed future training, preferably in a research or academic establishment of the same profile, before applying for advanced training.

This remarkably restrictive provision appears to have been designed not only to curtail interfield mobility, but also to pretest a person's ability, dedication, and suitability for pursuing a teaching or research career. A student entering directly from higher education must be recommended by the academic council of the higher educational establishment which he previously attended.[17] Other applicants must obtain a recommendation from their place of employment, and must submit a record of their research and publications. The Ministry of Higher and Secondary Specialized Education fixes an admission quota annually for each higher educational and research establishment as to the number of aspirants to be admitted, and in which fields.

Table V–1 presents information on the number of identifiable Soviet institutions[18] which

[16] *Zaria vostoka,* July 17, 1959; *Aspirantura—Spravochnik dlia postupaiushchikh v aspiranturu i soiskatelei uchenykh stepenei* (Aspirantura—Handbook for Entrants to Aspirantura and Persons Seeking Advanced Degrees), Moscow, 1960, p. 16.

[17] The academic council (*uchenyi sovet*) consists of the director, associate director, deans of faculties, chairmen-professors of the departments, and certain ranking professors. In addition, representatives of the Communist Party and trade union sit on the admission committee and thus their recommendations are needed also.

[18] There exist a number of institutions of the Soviet military establishment and research institutes which, though operating under civilian auspices, are classified as secret, for example, the Soviet atomic energy establishment (Ministry of Medium Machine Building) and the State Committee on Aviation Technology.

TABLE V–1.—*Soviet institutions conducting aspirantura training, 1960*

Higher educational establishments, by type		U.S.S.R. Academy of Sciences and republic academies		Research institutes and specialized academies	
Universities	38	U.S.S.R. Academy of Sciences	97	Ministry of Geology and Mineral Resources	5
Polytechnical and industrial	24	Siberian branch	6	Main Administration of Natural Gas Resources	3
Electrical engineering, radio engineering, engineering physics	7	Azerbaidzhan	19	Main Administration of Hydrometeorological Services of the U.S.S.R.	6
Machine building, ship building, aviation and polygraphic	23	Armenian	17	Main Administration of Highway Construction	1
Geological, mining, metallurgical	23	Belorussian	15	State Planning Committee	17
Chemical technology	10	Georgian	31	Ministry of Public Health, U.S.S.R.	14
Food technology	10	Kazakh	28	Ministry of Culture, U.S.S.R.	3
Light industry	7	Kirgiz	14	Ministry of Maritime Transport, U.S.S.R.	2
Construction and highway engineering	22	Latvian	15	Academy of Medical Sciences, U.S.S.R.	23
Hydrometeorology	1	Lithuanian	10	Ministry of Transportation, U.S.S.R.	1
Transportation and communication	19	Tadzhik	13	Ministry of Agriculture, U.S.S.R.	1
Agricultural, veterinary and forestry	53	Turkmen	9	All-union Academy of Agricultural Sciences	24
Economics and jurisprudence	22	Uzbek	13	Ministry of Communications, U.S.S.R.	3
Arts	13	Ukrainian	44	Union of Sports Association, U.S.S.R.	1
Medicine, stomatology and physical culture	68	Estonian	11	Committee on Standards and Measurements	2
Pedagogy and cultural services	58			Ministry of Electric Power Station Construction	5
				Academy of Construction Architecture, U.S.S.R.	16
				State Committee on Labor and Wages	1
				State Committee on Chemistry	18
				State Committee on Grain Production	1
				Subtotal	147
				Research institutes subordinated to union-republic ministries, commitees and regional economic councils	206
Total	398		342		353

Sources: Akademiia Nauk SSSR, A. V. Topchiev, (ed.), *Nauchnye kadry v SSSR—Sbornik dokumentov i spravochnykh materialov* (Research Personnel in the U.S.S.R.—Compilation of Decrees and Information Materials), Moscow, 1959, pp. 149–63; *Aspirantura—Spravochnik,* pp. 237–350.

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offer aspirantura training. The data indicate that 398 higher educational establishments, or about 55 percent of the total number of 719 such institutions, offered aspirantura training as of 1960. Within the network of the Academy of Sciences of the U.S.S.R. and the union republic academies, 342 institutions, or 57 percent of the total number of 603 research units of the academies, offered aspirantura training. Finally, among the 1,005 other specialized research institutes under other jurisdictions (including functional academies), 353, or 35 percent, offered aspirantura training.[19] Thus, less than one-half of Soviet higher educational and research establishments were recognized on qualitative grounds as suitable places to supervise advanced training.

It should be noted, furthermore, that although aspirantura training was carried on in a total of 1,093 establishments, the defense of candidate dissertations was permitted to take place in only 541 institutions, so that again about half of the number of institutions engaged in aspirantura training were qualitatively recognized to accept candidate theses.[20] (The number of institutions permitted to conduct the defense of doctoral dissertations was even smaller—283.[21])

Thus, to sum up, as of 1960 the differentiation of Soviet higher educational or research establishments according to whether they could engage in advanced degree training was as follows:

	Number of institutions	*Percent*
Total main research establishments and higher educational establishments	2,327	100
Permitted to engage in aspirantura training	1,093	47
Permitted to accept candidate theses	541	23
Permitted to accept doctoral theses	283	12

These figures have to be looked upon as approximations only, since the count of institutions can never be exact because of various factors discussed below. However, the pattern is clear, that only a small proportion of the total number of institutions were rated qualitatively suitable to engage in advanced degree training.

Each aspirantura applicant, after preliminary screening, is required to take three oral entrance examinations, generally held between August 1 and October 1—(1) in the subject in which he intends to do his work, (2) in one foreign language, and (3) in the history of the Communist Party of the U.S.S.R.[22] Those permitted to take the entrance examinations and are employed are given a month's leave of absence from their jobs, with pay, in order to prepare for them. The examination in the specialized field is considered the primary factor determining admission, and it is given first.[23] If the applicant passes it, he is then permitted to take the other two examinations. The examination in the specialized field is prepared by the department in which the student intends to take his advanced studies. It is conducted orally by a committee composed of the head of the research or higher educational establishment, two professors or associate professors or senior research associates of the department concerned, the applicant's tentative advisor, and the dean of the faculty of the higher educational institution or head of a division of the research institution.

The examination on the history of the Communist Party, also oral, is based on a list of literature prescribed for all higher educational establishments and research institutes,[24] and largely conforms to the material covered in this subject in all Soviet higher educational institutions.

As part of the examination in the foreign language, the applicant must, with the aid of a dictionary, prepare a written translation in one of three languages (English, French or German) of a technical text 1 to 1½ pages long within 50 minutes; in addition, he must disclose a knowledge of the grammar of the language and limited conversational aptitude on topics related to his major field as well as on general topics.

Students accepted into the program on the basis of their record and the entrance examina-

[19] For a discussion of the total number of research establishments, see below, especially tables V–32 and V–37.

[20] See the listing of institutions in appendix V–C, pts. I and II.

[21] Appendix V–C, pt. II.

[22] Until 1956 this examination was on the principles of Marxism-Leninism. Some aspirantura applicants (in philosophy, for example) must also take an examination in "political economy."

[23] *Aspirantura—Spravochnik*, p. 15.

[24] *Ibid.*, pp. 31–86.

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tions receive a monthly stipend of 800 rubles.[25] Each student is given an additional grant equivalent to one month's stipend for buying books and other materials.

Besides the regular program of full-time aspirantura training, there are extension-correspondence programs of 4 years' duration, which accept persons up to the age of 45 who have completed higher education and fulfilled the other requirements. Extension-correspondence aspirantura programs have been in existence since the late 1930's. They consist of periodic consultations between professor and student. The student is also permitted to use the regular higher educational or research facilities, such as libraries, laboratories, etc. Each year he is given paid leave up to 30 days (plus travel time) for consultations, examinations, and laboratory work, and eventually, leave to defend his dissertation.

In addition, a "special assignment" 1-year aspirantura program was set up in 1957.[26] This program accepts only higher education teachers or researchers for the purpose of "completing research" or preparing a dissertation. Participants are not subject to the usual admission procedures. Rather, they are assigned to aspirantura training by their respective higher educational or research establishments with full salary to study or prepare their theses in an institution offering special training not available in the institution where the person is employed. Similar "special assignment" 1-year aspirantura training was set up at the Academy of Sciences of the U.S.S.R. for persons assigned by the republic academies of science for training researchers in fields not offered by the home institutes.

Regular full-time aspirantura training is scheduled to last 3 years. Actually, only a third of the students complete their training in that period, up to the point of taking the candidate examinations and defending a dissertation. In 1957 the Minister of Higher Education severely criticized advanced degree training, in Moscow State University in particular.

> . . . a dangerous disease is widespread in the University. This disease is the unwarranted praise of young people. . . . The academic councils of the divisions of the University recommend for advanced training numbers of graduates, describing them as promising prospective scientists. It is evident, however, that well over half of the advanced degree students [at Moscow State University] fail to complete the requirements and submit a thesis by the end of the 3 years of study. This is a dangerous situation.[27]

In an effort to remedy the situation, various administrative measures were advocated, among them a 5-year "plan for study-research" leading to the writing of a dissertation, the placing of personal responsibility upon professors and deans of faculties for guiding the research through its completion, and the firing of academic personnel who were "too interested in multiple jobs at the expense of their chief duty."

In the physical sciences, chemistry and other experimental sciences it was noted that "the 3-year period for aspirantura training is insufficient for mastering contemporary theoretical knowledge, for carrying out the experimental work in a given area, and for obtaining interesting and sufficiently complete results, their theoretical interpretation and the writing of a dissertation."[28] It was proposed that aspirantura training be extended to at least 5 years, a suggestion which has not yet been accepted.

The general guidance of aspirantura students and responsibility for the actual quality of the training in the specialized field rest with the head of the appropriate department, and specifically with the individual professor who serves as the personal advisor to one or several students. Each aspirant is assigned to such a professor-advisor (*nauchnyi rukovoditel'*) when he begins his training. Together, they work out a program—an individual plan of research and reading based on the student's special interests and background. The student is entitled to at least 120 consultation hours per academic year with his special field advisor and 40 to 120 hours with other instructors. The student's progress is checked periodically by means of a report he submits to his advisor at the beginning of each

[25] Persons entering aspirantura programs directly from gainful employment and whose salaries exceeded this amount may receive up to 1,000 rubles as a stipend. There is also an arrangement whereby an aspirantura student who does research on a contract basis with industry can receive, instead of a stipend, an amount equal to 50 percent of the salary of a junior research associate. (*Ibid.*, p. 90.)

[26] *Ibid.*, pp. 16–21.

[27] *VyShkoSPR—1957*, pp. 225–26.

[28] *Vestnik Moskovskogo Universiteta* (Journal of Moscow University), No. 6, 1958, p. 235.

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academic year on the "fullfillment of plan for research and readings."

Each individual plan of study provides for (1) theoretical training in the major and minor fields, with "progress reports" on assigned topics; (2) seminars in political subjects (history of the Communist Party, Marxism-Leninism, political economy, etc.); (3) further study in the major foreign language and additional training in another foreign language; (4) required reading of Soviet and foreign literature in the major and minor fields; (5) research connected with the dissertation; (6) experimental work; (7) teaching and/or industrial experience; (8) taking the qualifying examinations for the candidate degree; and (9) preparation and defense of the dissertation. Except for the seminars in political subjects and the foreign language instruction, where groups of aspirants participate jointly, the entire program is based on an individual arrangement between the advisor and student. There are no formal course requirements, though the student must participate in departmental seminars and faculty meetings.

During the first 1½ to 2 years of training, the student is scheduled to complete the basic reading requirements, carry out the experimental work, fulfill the teaching and/or industrial training requirement (2–3 months), fulfill the seminar requirements in political subjects, and learn to read a second foreign language. He is regarded as a junior member of the departmental staff, participates in its activities, and makes use of the library and laboratory facilities.

During the course of the second year of study, the student is expected to pass the candidate minimum examinations, which, in general, are designed to demonstrate the specialized knowledge necessary for an advanced student to undertake the research for his dissertation. There are examinations in four subjects: (1) the student's major field; (2) the special field of his dissertation research; (3) political subjects; and (4) one foreign language. The examining board is composed of the institution's deputy director and two professors in the student's major field. The examination in dialectical and historical materialism (3, above) tests the student's general political knowledge of the prevailing communist orthodoxy and particularly in regard to his specialized field of study (i.e., the application of "dialectical materialism" to a specific field of physics, or Lenin's appraisal of the relativity theory). The other examinations test, respectively, his general and specialized knowledge in his field and his reading and translating ability in foreign scientific and technical literature. These examinatons are taken one at a time, but all four are supposed to be taken within a 3-year period. Obviously, to make this provision applicable to aspirantura students (as opposed to others who take the candidate minimum examinations), they must take the examinations within a two-year period at the most. The examinations may be taken more than once, until they are passed. Upon passing all of them, the student receives a certificate of completion of "candidate minimum."

All aspirants must take these candidate minimum examinations; passing them, in fact, is considered "successful completion of aspirantura training," even though the thesis may not be prepared and defended for many years thereafter, if at all. It is not necessary, however, for a person to be enrolled in a formal aspirantura program in order to take the examinations. Those considered otherwise "qualified," particularly persons who already hold academic or research appointments, may also take them. Success in the examinations is sufficient to satisfy the requirements for the completion of aspirantura training. The only stipulation, again, is that they be taken within 3 years. Once a person has passed them and been duly certified, there is no stipulation as to when (and often where, as well, since he may be at another institution) his dissertation is to be defended. At any time after receiving certification of completion of the "candidate minimum," he may petition to defend his candidate degree thesis. Over the years, it may be noted, only about half of the recipients of candidate degrees have taken formal aspirantura training.[29] The other half passed the candidate minimum examinations and went on to defend a thesis, without it.

On the other hand, and particularly since the 1957 revisions of procedures, aspirantura training does not necessarily lead to the defense of a candidate degree dissertation. Such training can be successfully completed without writ-

[29] Galkin, *Nau Kadry*, p. 138.

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ing a dissertation. If the student fulfills his individual study plan satisfactorily, and if the academic council of the institution approves his work, he may receive a certificate of successful completion of aspirantura training, indicating that he has passed the required examinations and completed a research assignment. This completes the process of aspirantura training, and the certificate remains permanently valid, though in this case the student has not yet earned a candidate degree.

In theory, however, the aspirantura student, after passing the candidate examinations, spends the third year concentrating on the research for and preparation of the thesis. When his advisor and the rest of the departmental staff feel that the dissertation meets the degree requirements, the aspirant petitions the chairman of the academic council of the institution where he is working to be allowed to defend it. The student also submits miscellaneous documents—work record, character references, higher education diploma, list of works and publications, the "candidate minimum" certificate, as well as several copies of the dissertation itself with a summary. Within 4 months of the submitting of these documents for review, the date for the public defense of the dissertation is set. The most recent revision of the rules, in 1960, stipulated that the research findings must be published at least 3 months prior to the dissertation defense, that a petition to defend the dissertation be made to an institution *other* than the one where the research was done, and that an additional outside source also make a review of the dissertation. In any case, the research findings must be published.[80]

Before 1960, once the dissertation was completed, two men who were considered experts on the subject and usually from outside the home institution, plus a third expert who was definitely from outside the institution, were asked to review it and give their opinions. After 1960, since the thesis defense must take place in an institution other than the home one, all the reviewers are automatically from the outside. The procedure remains the same, and the reviewers are known as "official opponents." At the public defense they act as questioners in addition to presenting their own evaluations of the dissertation.

Not less than 100 copies of the dissertation summary are distributed to other institutions and interested enterprises at least one month before the date scheduled for the defense. Actual copies of the dissertation must be in the hands of the academic council at least 2 weeks prior to the defense. Another one or two copies are deposited in the departmental library.[81] About 2 weeks before the defense, an announcement is published in the local newspapers.

The dissertation itself is defended at a meeting open to the public[82] before the academic council of the faculty or of the institution. Members of the board or anyone in the audience may ask questions relevant to the thesis topic. The thesis is then evaluated by the official opponents. After general debate, the student gives a summary statement in rebuttal to any criticisms made. Following his reply, a majority vote by secret ballot of the academic council decides the result. Although the candidate degree is granted by the institution, it is subject to subsequent review and official confirmation by the *VAK*.

Award Procedures for the Doctor Degree

Before being accepted for aspirantura training, the applicant must fulfill certain formal entrance requirements and take entrance examinations. There were no such requirements for *doktorantura* training in the U.S.S.R. when it existed prior to 1956. Doktorantura training was for those who wished formal preparation leading to the research needed for a doctor degree dissertation. It was sought by persons who either already had a candidate degree and a junior research or teaching appointment, or,

[80] In order to accommodate the flood of articles, the Ministry of Higher and Secondary Specialized Education has launched a number of subject-matter journals called *Nauchnye doklady vysshei shkoly* (Research Reports of Higher Schools), in 16 different fields, which contain largely articles based on the proposed dissertations of candidate degree seekers.

[81] One copy of the dissertation must also be sent to the national deposit library, the Lenin State Library in Moscow, or (for medicine and biology dissertations) to the Central Medical Library.

[82] Except for dissertations dealing with classified research topics (*zakrytye temy*), in which case the dissertation summary is not circulated, nor is public defense of the dissertation permitted.

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more frequently, by those who had the rank of professor or associate professor. In applying for such training, they submitted various certificates attesting to their previous education and employment experience, copies of their works with reviews, and an outline of their proposed research for the dissertation, but they were not subject to entrance examinations. After the records and the other materials submitted were reviewed and if the decision of the admission board, usually the academic council of an institution, was favorable, the applicant was accepted for doktorantura training. Applicants were supposed to be under 45 years of age, although if older they could, in individual cases, be granted special dispensation. While taking doktorantura training, most persons received compensation equal to their salary at the last place of employment.

The training program for doktorantura students was highly individualized, consisting primarily of advanced research under the general supervision of the head of the department or the director of a research institution. One principal advisor and two consultants were appointed from among the top academic or research personnel who were specialists in the subject; in some instances senior researchers from another institution were appointed as consultants. During the 4-year training program competence in a third foreign language had to be demonstrated. Monthly progress reports were submitted by the student. Following completion of the dissertation, a public defense was scheduled similar to that for the candidate degree, save that there were always three official opponents and at least two of them had to have the doctor degree themselves.

With the abolition of formal doktorantura training in 1956, the "creative furlough" (*tvorcheskii otpusk*) was introduced. This is a leave of absence up to 6 months, with full pay, in order to allow completion of research and writing and defense of a dissertation for the doctor degree.[83] Either a thesis or research of equal calibre is submitted, and the procedure for awarding the doctor degree continues to be the same as before 1956.

After the public defense, a successful person is not immediately awarded the doctor degree but is recommended to the *VAK* by the academic council of the higher educational or research establishment as having met the doctor degree requirements. The *VAK* sets up a special committee of experts to review the dissertation or the research materials in its stead, as well as the entire research and personal record of the person proposed. If the decision is favorable, the *VAK* itself awards the degree. The major difference between the procedure for awarding the candidate degree and that for the doctor degree is that in the former case the degree is awarded by the academic or research establishment and subsequently certified by the *VAK*, while in the latter case the degree is awarded directly by the *VAK* after a meticulous review of the dissertation and the personal qualifications of the recipient.

In addition, the *VAK* usually reviews doctoral dissertations on scientific grounds and also considers such other factors as past performance, ideological conformity, and even the political reliability of the doctor degree recipient. These considerations are less common in the case of candidate degrees.[84]

Persons who are considered "worthy" of doctor degrees may be "proposed" to the *VAK* by the academic councils of the various institutions without going through the routine of thesis preparation and defense. The proposal is accompanied by a statement about the person's past performance, an evaluation of his research, and copies of his published works together with their reviews. The work in such cases is often an outstanding piece of research, a scholarly treatise, or a text and is thus viewed as "equivalent" to a doctoral dissertation. A special committee of experts judges the case and then the *VAK* may, if it agrees that the research is "worthy," grant the degree.[85]

[83] *NKh–1957*, p. 260; *VyShkoSPR–1957*, p. 642.

[84] It is reported that the *VAK* certification for a candidate degree requires 1 to 8 weeks, but for a doctor degree, 6 months to 2 years. Moskovskii Gosudarstvennyi Universitet (Moscow State University), *Doktorskie i kandidatskie dissertatsii: 1934–54* (Doctor and Candidate Dissertations: 1934–54), Vol. I (Mathematics, Physics and Chemistry), Moscow, 1956, p. 6.

[85] There is one exception to this procedure. The Academy of Sciences of the U.S.S.R., by simple majority vote of its general assembly, may grant a doctor degree to anyone it pleases. It is not common, however, for degrees to be awarded in this way. Such degrees would be tantamount to the honorary degrees bestowed in the West.

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The 1960 Revision of Advanced Degree Award Procedures

In 1960 substantial modifications were made with respect to the award of advanced degrees:[86]

(1) Advanced degrees and academic ranks may be conferred only for work of theoretical or practical importance, containing new scientific conclusions and recommendations, theoretical generalizations, and scientific discoveries, as well as for published textbooks of a high standard.

(2) Before dissertations for the candidate or doctor degree in all applied subjects (engineering and science) may be presented, the academic council of the higher educational establishment or research institution must obtain an opinion from a leading industrial enterprise whose activities are directly related to the theme of the dissertation, indicating that the topic deserves to be considered for a degree. This statement must be submitted in addition to the opinions of the official opponents.

(3) For dissertations on theoretical problems in the natural sciences, the humanities, and the social sciences, there must be an opinion from an appropriate research institute, in addition to the opinions of the official opponents.

(4) The *VAK* was granted the right to permit the academic councils of higher educational establishments and research institutions to accept not only dissertations proper for the degree of candidate or doctor, but also published works which have enriched science or engineering with new solutions or discoveries, as well as major inventions of great economic importance which have been introduced in production, written up in the press, and registered with the U.S.S.R. Council of Ministers' Committee on Inventions and Discoveries.

(5) The academic councils of higher educational establishments and research institutions were instructed to accept dissertations for the candidate degree not earlier than 3 months—and for the doctor degree not earlier than 4 months—after the publication of works on the dissertation subject and/or the dissertations themselves.

(6) The public defense of the dissertation for the degree of candidate or doctor should, as a rule, be held not at the institution in which the aspirantura training was taken or place of employment of the applicant, but at some other higher educational establishment or research institution. The *VAK* was granted the right, however, in exceptional cases where it was absolutely necessary, to permit the academic councils of individual higher educational or research establishments to accept the dissertations of members of their own staff and of their own aspirantura students.

Some of these modifications merely confirmed existing practices, but there are three genuine changes. One is that the "worthiness" of a dissertation, or equivalent research, must be evaluated by an outside authority. The second is that the dissertation must be published several months prior to its public defense.[87] Finally, the rule that dissertations must be defended in an institution other than the home one is an entirely new departure. This procedure is like requiring a Harvard doctoral thesis to be presented at Yale, upon the recommendation of the American Council of Learned Societies that it is "worthy," with the thesis already published in a scholarly journal; or like having the General Electric Company certify that the work of a Massachusetts Institute of Technology graduate student is acceptable for the doctorate at the California Institute of Technology. Why such elaborate precautions are necessary appears to give cause for wonder. But the reasons become clearer after processing the many accounts in Soviet sources concerning "worthless" dissertation and research projects, nepotism, and even outright fraud in obtaining advanced degrees. Moreover, there appears to be a great distrust on the part of the *VAK*, which bears ultimate responsibility for the degree awards, toward those who supervise advanced degree training. The new rules have obviously been designed to insure integrity and qualitative standards.

The question of integrity has plagued Soviet advanced degree training for many years. The Soviet newspaper *Izvestia* recently published an article entitled "Concerning Honesty in Research." [88] It read:

Unfortunately, there are pitiful cases which are widespread among us which are sometimes con-

[86] *Pravda*, Feb. 7, 1960; *VVSh*, No. 3, Mar. 1960, pp. 3–5, 85.

[87] This requirement was first introduced in 1957, though the waiting period was not stipulated. See *VyShkoSPR–1957*, pp. 622–28.

[88] Apr. 16, 1960.

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siderately called in academic parlance "borrowing." . . . Strangely, however, such criminal acts are often viewed generously. There is even a "theory" whose proponents consider plagiarism not as a thing in itself but in its relation to total research work. Their argument is that in a research paper containing several hundred pages with only a few of them plagiarized, in percentage terms this is not significant. Perhaps we can understand the pleas of a defense attorney for a petty pickpocket who . . . has stolen just a little. But it is hardly right to hear such arguments in regard to research, where superior moral principles ought to prevail. . . .

The story went on to expose several members of the U.S.S.R. Academy of Sciences, who allegedly engaged in plagiarizing. It concluded with a plea that plagiarism, as well as falsification of data and distortion of facts and research findings, be abolished through the stricter application of the decree enabling the *VAK* to review and revoke the certification of advanced degrees and academic ranks of persons found to have acquired them "in error."

Although one may be inclined to shrug off Soviet reports of this kind as exceptional, it seems obvious that the 1960 revisions described above were intended to tighten the procedures leading to advanced degree awards and academic rank appointments and eliminate abuses. The Minister of Higher and Secondary Specialized Education, V. P. Eliutin, has himself deplored the "utter worthlessness of dissertations and thesis research" which have earned advanced degrees and academic titles for their producers.[39] Leniency on the part of the *VAK* and low standards were major targets of attack. "Under the present system of awarding degrees," it has been stated, "the *VAK* frequently puts up with low-quality dissertations, with the result that advanced degrees are received by persons who obviously do not deserve them." [40]

While the recent procedural changes may have resulted partly from the need to tighten standards and eliminate cheating, they may have much broader significance. Western visitors to the Soviet Union have observed a pronounced "inbreeding" in Soviet research and higher educational establishments, whereby a large proportion of the staff have obtained their degrees at the same establishment. A larger problem, however, is that many Soviet researchers consider this inbreeding detrimental to scientific progress. In the past it was an acceptable procedure on the grounds that certain staff requirements had to be met and there was a scarcity of highly trained personnel. Advanced training and degree awards within a given establishment thus made it possible to staff that establishment. A person so accredited, however, could be considered improperly trained according to the criteria of another research establishment. The procedural changes may have been designed, then, to promote mutually acceptable standards and to diminish "inbreeding" in academic and research institutions.

At the same time the 1960 changes were introduced, the *VAK* itself was chastised; and the expert committees within it, which review the work submitted for doctor degrees and academic ranks, were required to rotate their composition by one-third annually. The *VAK* was requested to seek out "erroneous" awards and was given the right, without time limitation, to revoke the degrees or academic ranks of persons whose work was found "unworthy." In addition, the issues of "practicality" and "ideological soundness" were explicitly incorporated in the new rules.

In spite of the shortcomings which have been noted in the procedures for awarding advanced degrees, it might well be remembered that Soviet propaganda makers often resort to the tactic of wholesale deprecation of the past in order to justify changes.[41] This maneuver is used not only in international and domestic politics but in other facets of Soviet life, including education, science, and research, as a means of shifting the blame for shortcomings away from the system itself on to individuals. As regards Soviet advanced degree and academic rank holders, the recent denunciations of past abuses and the promise to eradicate them may be a necessary instrumentality for change under Soviet conditions. The situation was probably not so bad in the past as the recent stories would indicate;

[39] *VVSh*, No. 3, Mar. 1959, p. 3.

[40] *Izvestia*, Oct. 25, 1959, an article titled "The Advanced Degree Is Not a Prize."

[41] Strangely enough, it is frequently just at such times that new data are released, sometimes for the first time, and the curtain is drawn aside, for a while at least, permitting us to draw penetrating insights into Soviet reality. This phenomenon has already been pointed out in other connections in chs. I, II, and IV.

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nor, by the same token, will it be so rosy in the future.

To sum up, during the last 25 years the Soviet Union has established highly centralized control and supervision of appointments to academic rank and the awarding of advanced degrees. During this period the latter have become a symbol of prestige, and great formal significance is attached to them.

They are, however, not regarded as prerequisites for academic appointment. Frequently the advanced degree is received *after* appointment to academic rank or to a research position,[42] and it may be conferred in recognition for outstanding research accomplishment.

The highly individualized plan of study in the U.S.S.R., while different from the usual training procedures for obtaining advanced degrees in the U.S., is fairly comparable to practices in some European countries, where an informal setting and individual study also prevail. There are no other countries in the world, however, where there is more centralized control over advanced degree awards and academic rank appointments than the U.S.S.R. There are two elements in the Soviet program which bear some resemblance to the American and European procedures: (1) special comprehensive examinations and (2) the completion of either a dissertation or an equivalent piece of research–both prerequisites for obtaining either degree.

Qualitative Problems of Advanced Degree Training

Soviet advanced degree programs are ideally oriented toward training the student to do research work or to teach in higher education. Their success is thus indicated to some degree by the quality of the dissertation, in which the student must display his specialized knowledge and ability to analyze a given problem, while conforming to communist dogma and the research priorities of the Soviet planners.

Meticulous instructions are given to the student for preparing his dissertation.[43] However, to attempt an evaluation of the contents or quality of the individual dissertations themselves presents a difficult problem. The best way to judge their quality would be to have American specialists in the particular fields review them individually. But since such evaluations have not been made (and probably could not be, for a variety of reasons), qualitative judgments must be based almost entirely on Soviet accounts of both the strengths and the weaknesses of advanced degree dissertations.[44]

It has been pointed out elsewhere that science, research and higher education teaching in the U.S.S.R. are lucrative, respectable and highly sought after areas of human activity. Some of the most creative minds in Soviet society flock to them for their life's work. On the other hand, the prestige and great rewards that are their concomitants also attract status-seekers and hucksters. Thus the problem is how to attract those with genuine creative talent and exclude those who would enter such fields purely for personal gain.

Fifteen years ago a noted British scientist, Sir Eric Ashby, basing his remarks on close observation of the Soviet scientific community, said:

> Scientific research ranks above clinical medicine or the law as a profitable career . . . and first-class men are surrounded by, and considerably hampered by, large numbers of workers of indifferent quality. . . . The result of it is that the *average* quality of scientific work in the Soviet Union is low, simply because there is an excess of low-quality workers. . . .[45]

More recently, the Soviet Academician M. A.

[42] This is also not uncommon in the United States.

[43] L. D. Sheviakov, *Kak rabotat' nad dissertatsiei* (How to Prepare a Dissertation), Moscow, 1960. This is a special instruction booklet prepared by the Academy of Sciences of the U.S.S.R.

[44] *Vestnik vysshei shkoly* (Journal of Higher Education), abbreviated throughout this study as *VVSh*, runs frequent stories concerning the general quality of advanced degree dissertations and discusses other problems connected with advanced training. There are frequent summaries of dissertations, particularly those in the social sciences. The new periodicals, *Nauchnye doklady vysshei shkoly*, also carry summaries of a number of dissertations. *Vestnik Akademii Nauk SSSR* (Journal of the Academy of Sciences of the U.S.S.R.) often publishes dissertation topics and brief summaries of dissertations. Abstracts or summaries of these dissertations appear in article form in other publications of the Academy of Sciences of the U.S.S.R. and the republic academies. Articles based on dissertations are also published in various trade magazines, such as *Ugol'* (Coal), *Elektrichestvo* (Electricity), *Tsement* (Cement), etc. Local papers may run notices about the forthcoming public defenses of dissertations. Finally, Soviet newspapers carry stories of individual malpractice cases in the award of degrees or of deficiencies in advanced research. The Lenin State Library in Moscow also publishes a quarterly directory of candidate and doctoral dissertations, which have been deposited there.

[45] Ashby, *Scientist in Russia*, pp. 204–05.

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Lavrent'ev, the head of the newly established Siberian branch of the Academy of Sciences of the U.S.S.R., remarked:

> We have to uphold our principles to the utmost and be totally merciless toward those who enter science not for science's sake and its application to life, but for the sake of advanced degrees and titles. We ought not to conceal the grave situation that we have tens of thousands of researchers with candidate degrees from whom the country has not as yet received any scientific or practical contribution.[46]

The problem was most forcefully stated in the following account:

> In the roster of persons who have received advanced degrees, it is possible to find many names of scientists whose first and last scientific accomplishment was their dissertation, which, by the way, was often completed solely because of the active participation of a thesis advisor preoccupied with the fulfillment of the plan for training graduate students.
>
> It is no secret that the performance of our scientific research institutes is frequently quite insignificant. The egalitarian pay scale is most corrupting. Among members of the scientific community, one encounters more and more persons who love the quiet life, who do not want to risk their authority and position, who do not undertake the investigation of complex, controversial problems, and who even hinder new and daring research.
>
> The writing of a dissertation frequently serves no purpose other than self-promotion. The subject of the dissertation is often artificially invented for the prospective author by the thesis advisor and frequently, moreover, is contrived in such a way that it can be written with ease and as quickly as possible. There is even a special term coined for this—"defensible thesis subject." These "defensible thesis subjects" are the very ones which lack all vital significance and are completely useless.
>
> With such a thesis subject in mind, the advanced degree seeker begins feverishly to compile the needed material so that he can bang out a 100- to 200-page "scientific treatise." There is even a standard for the length of the dissertation. This dissertation will give a person the chance to become a rentier of sorts, who will earn perpetual dividends from this once-produced "capital asset."
>
> It is not surprising that among young scientists there are circulating abominable sayings, such as, "A degree is power," "What is important is not knowledge, but a degree," "To succeed, you don't have to be a scientist, but a degree-holder," and the very hideous motto, "On to degrees!" [47]

In order to correct this situation, it was proposed in 1956 that "advanced degrees should be awarded not for artificially contrived work consisting of more or less skillfully assembled quotations, but for a definite contribution to science itself, as well as to the production effort." [48]

Obviously the quality of advanced degree training depends in large measure upon the individual student's work under the guidance of his faculty advisor. An examination of the theses from Moscow State University, certainly one of the Soviet Union's top higher educational establishments, reveals the following picture.[49] From 1934 through 1954, a total of 3,548 candidate and 386 doctor degree dissertations were defended. In addition, the university's Institute for the Improvement of the Qualifications of the Teachers of Marxism-Leninism has awarded 393 candidate degrees since 1950. Among this total of 4,327 advanced degrees, about 1,300, or one-third, were awarded to persons from other institutions, who came to the university to defend their dissertations. The degrees were about evenly divided between the social sciences and the humanities (2,143) and the natural, physical and other exact sciences (2,184).

In the natural, physical and exact sciences, there were 253 thesis supervisors at Moscow State University, or only about 10 percent of the total faculty.[50] Over the 20-year period for which the theses were listed, 110 advisors had supervised only one thesis each. Seventy-three advisors—about half of them the top research men in the country—had supervised five or more dissertations. A similar situation was true of Leningrad State University.[51]

The personal relationship between advisor and advanced degree student is a close one and probably a source of qualitative differences in dissertations. In addition, the selection of opponents may be an area of strength as well as abuse, as indicated by the following account:

> In 1955 Mr. K., who already held a candidate

[46] Speech at the 21st Congress of the CPSU, reported in *Pravda*, Feb. 1, 1959. See a similar criticism in *Kazakhstanskaia pravda* (Kazakhstan Truth), May 15, 1959.

[47] *Komsomol'skaia pravda*, Mar. 20, 1956, p. 2.

[48] Speech by Academician T. S. Mal'tsev, with particular regard to biological and agricultural research, reported in *Pravda*, Feb. 25, 1956.

[49] MGU, *Doktorskie i kandidatskie dissertatsii*, esp. pp. 5–19 and 248–52.

[50] In 1956 the total faculty numbered 2,258 (MGU, *Otchet o deiatel'nosti MGU*, p. 15).

[51] Leningradskii Gosudarstvennyi Universitet (Leningrad State University), *Dissertatsii: 1934–54* (Dissertations: 1934–54), Leningrad, 1955, *passim*.

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degree in engineering, wrote a doctoral dissertation for the Metallurgical Institute of the Academy of Sciences of the U.S.S.R. Because of its poor quality and negative review by the two official opponents, this dissertation was rejected. Two or three weeks later he made several superficial corrections, retyped it and submitted it again. Arrangements were made this time, and different official opponents were chosen as "more reliable." They gave a positive opinion . . . and a new doctor degree holder in engineering was born.[52]

That such a situation could occur in one of the top research institutions of the country is indicative of the pressure upon academic advisors and academic councils to see that their protege's thesis is "defensible"; otherwise unfavorable light may be cast on their own work:

As everyone knows, nowadays it is not the student himself who bears the primary responsibility for defending his dissertation on time, but his academic advisor. Consequently, certain advisors, wishing to avoid unpleasantness, either pass the student with a poorly prepared dissertation or directly participate in the writing.[53]

Nor can the procedures for defending dissertations in public be viewed as a sufficient qualitative safeguard. It is reported that the entire defense of a dissertation is merely a formality: "The defense of dissertations is dull as a rule. Members of the academic council are totally disinterested in the actual defense. . . ." [54] The questions asked, the account goes on, dwell on the "accomplishments" of the research, but the answers are known to all in advance. The official opponents are "carefully chosen" and do not stress the shortcomings of the dissertation; and since the person defending it already knows the opinions of the official opponents, he has prepared all the necessary answers. This is not a new problem. Earlier criticisms of dissertation defense procedures noted:

A superficial approach to the defense of dissertations has still not been extirpated from the work of some academic councils. Not infrequently the members of the academic councils do not acquaint themselves with the contents of the dissertations. During the defense . . . conditions are not created for businesslike criticism, discussions are not developed to test the knowledge of the dissertation writer, or his point of view, allowing the conclusions or results of his research to be appraised in a comprehensive manner. The meetings of the academic councils . . . have the character of an ostentatious "act of graduation." Sometimes academic councils mechanically stamp dissertations submitted for examination by them, relying on the benevolent conclusions of the official opponents. Thus it happens that academic councils sometimes recommend academic degrees for obviously low-grade, inferior work.[55]

The article went on to say that frequently dissertations were defended before the members of the academic council only, and that those representing the "public" were actually members of the department concerned with the subject. This led to a situation where there were only two or three persons present at the defense of a dissertation who were really competent in its specialized subject and that these people had already made a "favorable judgment" on it anyway.

Soviet professors, researchers, engineers, and specialists of all types are called upon to sit on the *VAK*'s expert commissions to pass judgment on dissertations and to review the qualifications of the candidates for degrees or academic appointments. During the academic year 1949–50, for example, there were 72 such commissions of experts. Included among their members were about 1,000 scientists and scholars, 100 academicians, 750 professors and doctors of science, 50 specialists from industry, etc.[56] In view of such academic strength, one would think that the *VAK*'s review power would be a significant quality indicator of dissertations. It seems that this is not always the case, however. Academician Lavrent'ev has remarked: "The Supreme Certification Commission has 70 members. In each specialty field there are only 1 or 2 persons; therefore the award of degrees is based not on the expertise of specialists, but actually on blind faith. The 70 most prominent researchers of the country are simply wasting their time." [57]

From available statistics, it would seem that the *VAK*'s scrutiny of persons proposed for advanced degrees and academic appointments is in inverse relation to the numbers involved. During the 10 years 1947–56, the *VAK* declined recommendations for the doctor's degrees and for professorships at a substantially higher rate than for candidate degrees and associate professorships. The percentage of prospective ad-

[52] *Izvestia*, Sept. 20, 1959.
[53] *VVSh*, No. 8, Aug. 1955, p. 16.
[54] *Kommunist* (Armenia), Dec. 19, 1958.
[55] *VVSh*, No. 1, January 1946, p. 51.
[56] *Izvestia*, July 11, 1951.
[57] *Pravda*, Feb. 1, 1959.

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vanced degree awards and academic rank appointments rejected varied from 1 to 10 percent, as shown in table V–2.

TABLE V–2.—*Rates of rejection of persons proposed for advanced academic rank and advanced degree award by the VAK, 1947–56*

Rank or degree	Total number of awards made	Number of rejections by VAK	Rate of rejection
Academic rank:			
Professors	5,001	350	7.0
Associate professors (*dotsents*)	22,647	1,119	4.9
Advanced degrees:			
Doctor	5,632	581	10.3
Candidate	63,200	956	1.5

Source: Galkin, *Nau Kadry*, pp. 158, 161–62; appendix table V–A–5.

These rates appear to be nominal and relatively small. Unfortunately, we do not know the specific reasons for the rejections. The majority of rejections are said to be made on "qualitative" grounds. It is likely, however, that some rejections are attributable to political factors also, for the *VAK* considers the political record of persons proposed for advanced ranks and degrees.

The *VAK* makes rejections "without explanation," [58] so that no one, not even the members of the academic councils who recommend the awards in the first place, really knows on what grounds an advanced degree is refused. There is a provision that a person whose degree is not approved may petition for further review by the *VAK* within three months, but if the degree is not approved the second time, the verdict is final and again no reason needs to be given.

The Soviet press, however, sometimes discusses the reasons for a rejection. For example, it was discovered that parts of a dissertation by a degree candidate in history were plagiarized.[59] Several dissertations in military science were rejected as not being up to standard, lacking originality or duplicating research done elsewhere.[60] Some dissertations were rejected for "political" reasons: (1) works written from a bourgeois-nationalist and an apolitical point of view; (2) works reflecting subservience to foreign scholarship; (3) works containing political and methodological errors.[61] A dissertation in jurisprudence, for example, was rejected because it was "full of errors of a bourgeois nationalist nature. . . ." [62] A dissertation in economics was condemned because it "was written from the standpoint of bourgeois objectivism, had no ideological orientation, and publicized the 'achievements' of the American footwear industry in the organization of the production line system." [63] An engineering thesis was condemned by the *VAK* because "the author made an analysis of foreign housing construction [engineering] without utilizing great Soviet experience [in this area] . . . [which] led the author to a number of absurd assertions." [64] A doctor degree and associate professorship were revoked because of the "antiparty appraisal of the scientific heritage of I. P. Pavlov, whose work was unquestionably recognized as superior by Lenin." [65]

Whatever the reasons behind the rejection of the degree award may be, it is important to remember that the *VAK* acts as a check on individual institutions and even individual faculty advisors, for rejection of a dissertation reflects upon the institution and the personnel who supervised it. But this function has apparently been considered inadequately carried out, and in the 1960 revisions the following new proposals were made.[66]

The *VAK* is to be composed of 238 members, who will be the top scholars of the country. It will have 7 sections and one-third of the review committee membership will be rotated annually. In reviewing proposals for advanced degrees and academic appointments, the *VAK* will consider not only the dissertations and the recommendations accompanying them, but also the entire research and political record of the applicant. It will continue to have retroactive power to revoke degrees and academic ranks.

Admittedly, there are inter-institutional and

[58] *Kommunist* (Armenia), Dec. 19, 1958.
[59] *Pravda*, Aug. 4, 1952.
[60] *Krasnaia zvezda* (Red Star), Aug. 21, 1950.
[61] *Literaturnaia gazeta*, Feb. 21, 1953; *Izvestia*, July 11, 1951.
[62] *Izvestia*, Jan. 23, 1953.
[63] *Ibid.*, July 11, 1951.
[64] *Idem.*
[65] P. P. Polianskii, *Kalininskii Gosudarstvennyi Pedagogicheskii Institut* (Kalinin State Pedagogical Institute), Kalinin, 1959, pp. 110–11.
[66] *VVSh*, No. 3, Mar. 1960, p. 4.

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inter- and intra-discriplinary variations in advanced degree dissertations in every country. The Soviet Union is no exception. One may be highly impressed by a doctor's dissertation in engineering on the problems of the theory of elasticity in anisotropic bodies.[67] One can also find scores of titles of interesting and qualitatively promising dissertation topics in mathematics, physics and chemistry. A dissertation concerning the structure of polycrystal layers of copper oxide elements related to the photoelectric theory, or one on problems of instrumental seismology, may be considered suitable topics for the doctor's degree.

However, a dissertation for the doctor degree on the design of depth pumps for oil wells is of questionable scientific value, and the mediocrity of a candidate degree dissertation on mobile machine repair shops in agriculture is self-evident. Similarly, a doctoral dissertation on the existing techniques of pipe rolling, without critical examination of new technology or discussion of new engineering problems, is astounding.[68]

While one can easily appreciate an attempt to explore the Pavlovian theory in a dissertation for the degree of doctor of medical sciences on psychic disturbances from noncerebral wounds, one is bewildered to find that a degree candidate in medical sciences tried, by the same Pavlovian theory, to prove the inverse relationship between air temperature and the speed of *rigor mortis*. Although the *VAK* was quite indignant about the latter application of the Pavlovian theory and the "experimental findings" on 45 dogs presented in the thesis, which purported to disprove the alleged relationship, the fact remains that a dissertation of this sort was approved by an institute, worked on, "successfully" defended, and only later received condemnation.[69] One also wonders about candidate dissertation topics such as—"the selection and biochemistry of pumpkins in the black soil regions of the U.S.S.R."; "brake adjustments as a speed factor of trains"; "the interrelationship between the working ability of horses and their higher nervous system functioning"; or "warming-up exercises for gymnasts in relationship to their individual traits." [70]

These examples, perhaps extreme, reveal vividly the uneven quality of advanced degree dissertations. Although in the U.S. educational setting there are undoubtedly wide variations in qualitative standards in advanced degree dissertations, in the Soviet Union the situation is further complicated by external factors, the most significant of which are ideological dictates and the continuing drive for "practical results" in research.

Not only is there academic reluctance to engage in applied research only, but there is resistance on the part of industrial management to academic "snoopers" which must be overcome as well, as the following example illustrates. To a student preparing a candidate dissertation in an engineering field, the plant director declared: "Let us be honest about it. If you have come here to help us, we welcome you. But if you have come to collect data for your candidate thesis, do not ask for it. We are busy people. We cannot waste time on such nonsense." [71] Perhaps in an effort to foster closer ties among research, education, and technology, "agreements of creative cooperation" (*dogovor tvorcheskogo sodruzhestva*) have been set up in recent years, through which one or several higher educational establishments and an industrial plant agree to develop new products or processes together or improve existing ones.[72] Degree candidates are asked to work on such problems of applied research.

Although some dissertations of apparent significance are occasionally mentioned in the Soviet literature, their content is not discussed because of the prevailing secrecy code. There are undoubtedly good dissertations in the fields of aerodynamics, some branches of mathematics, nuclear physics, electronics, and the like, about which little is known.[73] In fact, official Soviet

[67] A fair cross-section of recent dissertation topics may be found in Gosudarstvennaia Biblioteka SSSR imeni Lenina (Lenin State Library), *Katalog kandidatskikh i doktorskikh dissertatsii* (Catalogue of Candidate and Doctor Degree Dissertations), Moscow, 1960, *passim*. This is a quarterly publication and lists some 2,000 dissertation titles.

[68] *Izvestia*, Sept. 9, 1959.

[69] *VVSh*, No. 1, Jan. 1951, p. 24.

[70] *Katalog kandidatskikh i doktorskikh dissertatsii*, pp. 68, 119, 144, 150.

[71] *Sotsialisticheskii trud*, No. 7, 1958, p. 116.

[72] *Sovetskaia Rossiia*, Aug. 5, 1959, reports a number of such agreements in Leningrad.

[73] Occasionally when theses in atomic physics, aerodynamics and a few other such fields are listed in Soviet sources, there is no identification of the research institute which approved them. Instead of the name of the specific establishment, it merely says, "dissertation approved by a research institute."

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regulations make it clear that there are secret dissertation subjects, which are neither published, abstracted, nor defended in public.[74] A large number of candidate degree theses in engineering and the sciences are handled by Soviet authorities on a classified basis. There are two possible speculations as to the quality of these dissertations.

As pointed out by Gorokhoff of the Library of Congress, after a meticulous survey of Soviet publishing procedures, censorship restrictions, and secrecy laws: "It is not unreasonable to assume that many of the most outstanding achievements of Soviet science and technology are *not* printed in open Soviet journals, and thus the information available to the West is not a full picture of Soviet science." [75] On the other hand, there is official Soviet admission that "serious deficiencies exist in the defense of classified dissertations. In a number of cases, work is classified without sufficient reason, which lowers significantly the public control of the research community over the quality of the research work involved." [76]

Without going further into individual cases, it is apparent that four major considerations must be taken into account in making an evaluation of Soviet advanced degrees. First, there is variation because of individual factors (ambition and ingenuity coupled with dishonesty and mediocrity), differences in the institutional setting, interaction with the control factor by the academic councils and the *VAK*. Second, there is pressure exercised via the ideological and political dictates, which undoubtedly have some effect upon the quality of advanced research. There are periodic drives to restore the political and ideological "purity" of research and prostitute truth to dogma. The fields of biological and agricultural sciences and a large segment of the social sciences are thus particularly hampered. It should be noted, however, that in general this ideological interference in the physical sciences often concerns the philosophy of science and the acceptance of hypotheses, and therefore causes fewer handicaps in dissertations dealing with specific problems. Third, there is pressure to obtain applied results, which is most significant in the physical science and engineering dissertations. Fourth, as an outgrowth of the prevailing secrecy in various phases of applied research, there is a quality variation of "unknown dimension."

[74] *VyShkoSPR–1957*, pp. 285, 287.
[75] B. I. Gorokhoff, *Publishing in the U.S.S.R.*, Indiana University Publications, Slavic and East European Series, vol. XIX, 1959, p. 189.
[76] *VyShkoSPR–1957*, p. 285.

Quantitative Aspects of Advanced Training and the Award of Advanced Degrees

While there will inevitably be some uncertainty about the actual quality of advanced degree dissertations, the quantitative aspects of Soviet advanced training can be ascertained with considerable accuracy. Several distinct components of advanced degree training have been singled out and the quantitative aspects related to these components.

1. *Aspirantura Training*

The discussion of quantitative aspects of Soviet advanced degree programs should properly start with a discussion of aspirantura training. Although it would be revealing to scan the number of acceptances for such training, data concerning them are available for only a few years.[77] Acceptances for a few years in the 1930's were in the neighborhood of 3,500 per annum and had more than doubled by the early 1950's—to about 7,500 per annum. However, an attempt to follow aspirantura acceptances and to trace the number of those who successfully completed this type of training proved to be an impossible task since, as explained earlier, the awarding of the candidate degree is not necessarily related to the completion of aspirantura training. Furthermore, a large proportion of aspirantura students drop out before the completion of their training, and those who do finish it often take a considerably longer time than the maximum 3 years specified. While considerable attention is given to these complicated factors, it is impossible to relate them satisfactorily to the figures on original acceptances in aspirantura training.

On the basis of the data summarized in appendix table V–A–1, chart XXVI has been constructed to show enrollment trends in aspiran-

[77] See appendix table V–A–1.

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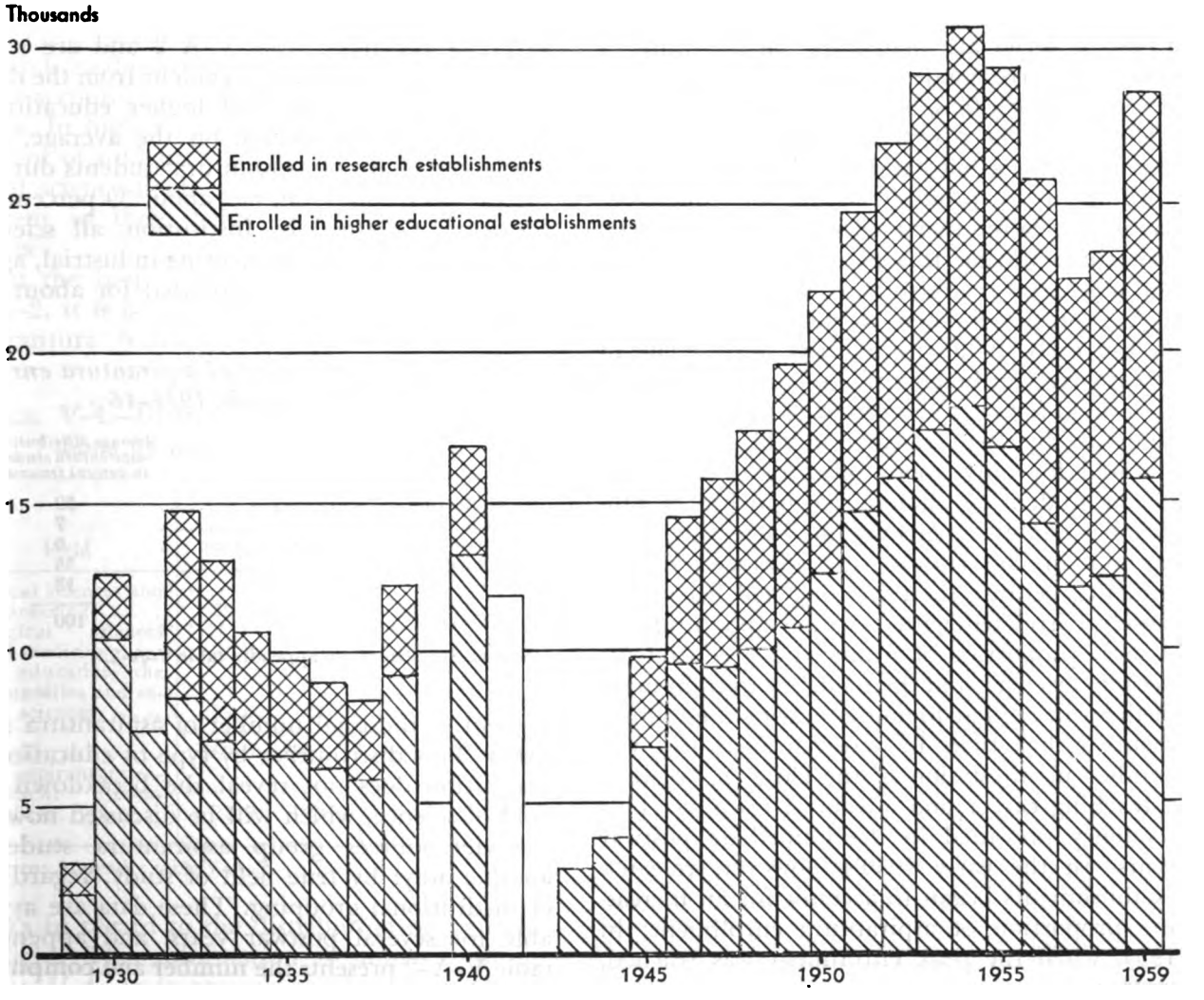
tura programs during the last 30 years. Starting from zero in 1925, by 1929 enrollment had reached 3,000. It then shot up rapidly, reaching a peak of almost 15,000 in 1932, but declined throughout the rest of the 1930's. It should be remembered, of course, that aspirantura training did not lead to a candidate degree until 1934, and those who "completed" it were simply assigned as researchers or appointed to teaching rank in higher educational establishments. The decrees issued between 1934 and 1937 helped to boost aspirantura enrollment again, and the prewar peak of about 17,000 advanced students was reached in 1940.

After a sharp setback during the Second World War, the level of 17,000 aspirantura students was again reached in 1948. In the next 6 years enrollment increased by another 80 percent, for a total of about 31,000 in 1954, the highest figure ever to be reached. Owing to the imposition of various restrictions upon access to aspirantura training, after 1954 enrollment declined to 22,000 in 1957, picking up slightly in 1958 (23,000) and rising to 28,600 in 1959.

CHART XXVI.—ADVANCED DEGREE TRAINING—ASPIRANTURA ENROLLMENT, 1929–59



Source: Appendix table V–A–1.

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Until 1937, extension-correspondence programs for aspirantura training, though in existence, were not officially encouraged. Official recognition came in 1938, when extension-correspondence programs in higher education were similarly recognized. In 1940 there were only 2,500 extension-correspondence students, representing about 15 percent of the total aspirantura enrollment.[78] In 1955 the number of such students increased to 8,000, or about 27 percent of the total aspirantura enrollment. Extension-correspondence enrollment was not significantly affected by cutbacks in the mid- and late 1950's, as regular enrollment was, and remained at a level of about 7,500 between 1956 and 1958. In 1959 there were 10,000 extension-correspondence students, representing about 35 percent of total aspirantura enrollment. Thus postwar enrollment series are biased by the inclusion of extension-correspondence students. Without allowing for such bias, it is apparent that between 1940 and 1959 advanced training enrollment expanded at a substantially slower rate than enrollment in professional higher education. While the latter increased about two and one-half times during this period, aspirantura enrollment grew by only about 35 percent.

Another development should be noted. While in the early 1930's aspirantura enrollment in research establishments was relatively high and accounted for over 45 percent of all aspirantura students, by 1940 research establishments accounted for only about one-fifth of advanced degree student enrollment. Regular higher educational establishments became increasingly important in the training of advanced degree students, because their training had become so closely correlated with teaching appointments. A large proportion of advanced degree students became teachers, and the tendency to train more of them in regular higher educational establishments rather than in research institutes was another manifestation of the close tie between a teaching career and advanced training. This tendency prevailed in the immediate postwar years. In the early 1950's, however, research establishments began to account for an increasing proportion of aspirantura enrollment; in 1954, when the peak enrollment was reached, 41 percent of aspirantura students were enrolled in research establishments. In the cutbacks which followed, enrollments in higher educational establishments were more heavily affected than those in research institutes. As a result, in 1958, 47 percent of advanced degree students were enrolled in research establishments. The increased aspirantura enrollment in 1959 reversed this trend, however, and in that year 45.5 percent of aspirants were in research establishments.

In the late 1930's and 1940's aspirantura enrollment in higher educational establishments was reported by branch, as was the case in the grouping of higher education students by type of institution. The data on distribution of enrollment by type of institution in which the training takes place are presented in the supplement to appendix table V–A–2 and are summarized in table V–3. It is evident from the data that engineering-industrial higher educational establishments accounted, on the average, for the largest share of aspirantura students during the period in question, i.e., about 39 percent of the total. Grouped by institution, all science fields together (i.e., engineering-industrial, agricultural, and medical) accounted for about 60 percent of the total number of aspirantura students. This distribution by type of educational institution does not reveal the breakdown by field of science, which will be discussed now.

TABLE V–3.—*Distribution of aspirantura enrollment by branch, 1934–46*

Branch	*Average distribution of aspirantura students in percent (rounded)*
All engineering	39
Agricultural	7
Socioeconomic	6
Educational	35
Medical	13
Total	100

Source: Supplement to appendix table V–A–2.

Soviet sources group aspirantura students another way: by true field of study, regardless of institutional grouping. These data are available for several postwar years, and appendix table V–A–2 presents the number and computed percentage distribution of advanced students by

[78] Appendix table V–A–1.

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field. Chart XXVII depicts aspirantura enrollment by field in 1951 and 1959, and indicates the heavy emphasis upon engineering and the physical sciences in 1959 as compared to 1951. In most other fields, in fact, there were fewer aspirantura students in 1959 than in 1951. The only social science field showing an increase was economics and planning. By contrast, aspirantura enrollment in engineering fields almost doubled, in physics-mathematics more than tripled, and in other physical and biological science fields increased substantially during the 1950's.

Appendix table V–A–2 also summarizes the distribution of aspirantura students by field of study in the fall of 1955, separately for higher educational establishments and research institutes. In that year about 71 percent of all aspirantura students were in scientific fields. In research establishments, enrollment in scientific fields accounted for about 82 percent of all students. In higher educational establishments 36 percent of students were in the humanities and social science fields, as compared with only 18 percent in these fields in research establishments.

On the basis of the data in appendix table V–A–2, it is possible to ascertain the trends in aspirantura training which prevailed in the 1950's in regard to the distribution of training by field. This information is summed up in Table V–4. It is remarkable indeed to what extent advanced student enrollment in the physical sciences and engineering has gained ground in recent years over the humanities and the social sciences. Obviously the cutbacks in aspirantura enrollment during the last few years have affected primarily the enrollment in the humanities and the social sciences, which dropped from 8,400 in 1955 to 6,300 in 1959. During the 1950's the proportion of students in these fields among the total was cut almost in half, from 39 percent in 1950 to 22 percent in 1959. The numerical increase in enrollment in 1959 did not markedly affect this distribution. This trend is fully consistent with the developments in Soviet higher education where emphasis has been shifted in recent years to applied fields, especially engineering. The intensification of research activity in physical sciences and engineering in recent years has called for more people with advanced training. The shifting priorities indicate that in advanced degree training programs, as evidenced elsewhere, the Soviet regime has apparently little use for humanists or generalists.

TABLE V–4.—*Distribution of aspirantura students by field of study, 1951–59*

Field	Distribution in percent			
	1951	1955	1958	1959
Physical sciences and engineering	39.2	50.4	58.8	58.3
Biological sciences and medicine	21.8	20.9	19.6	19.6
Arts, education, the humanities and social sciences	39.0	28.7	21.6	22.1
Total	100.0	100.0	100.0	100.0
Total aspirantura enrollment (thousands.)	21.9	29.4	23.1	28.6

Source: Appendix table V–A–2.

2. *Completion of Aspirantura Training and Its Relationship to the Award of Candidate Degrees*

A sharp distinction must be made between the number of persons who have actually "completed" aspirantura training and those who have successfully defended a dissertation and been granted a candidate degree. Between 1925 and 1947, about 25,000 persons "completed" aspirantura training in regular higher educational establishments (i.e., excluding research institutes, which probably accounted for about 11,000 during the same period).[79] Of these 25,000, only about 60 percent eventually defended a dissertation for the candidate degree, but the number of those who defended such a dissertation within the specified 3 years was "considerably less."[80] Between 1935 and 1938 only 39.8 percent (1,738) of those who "completed" aspirantura training (4,366) defended a

[79] The first part of this statement is based on Sinetskii, *PP Kadry*, p. 176. The second part is an estimate based on the assumption that the unweighted average of the proportion of aspirantura students in research institutes during this period was about 30 percent of the total. Under the assumption of uniformity of "completion" of training, therefore, research institutes probably also accounted for about 10,700 students during the period in question.

[80] Sinetskii, *PP Kadry*, p. 184.

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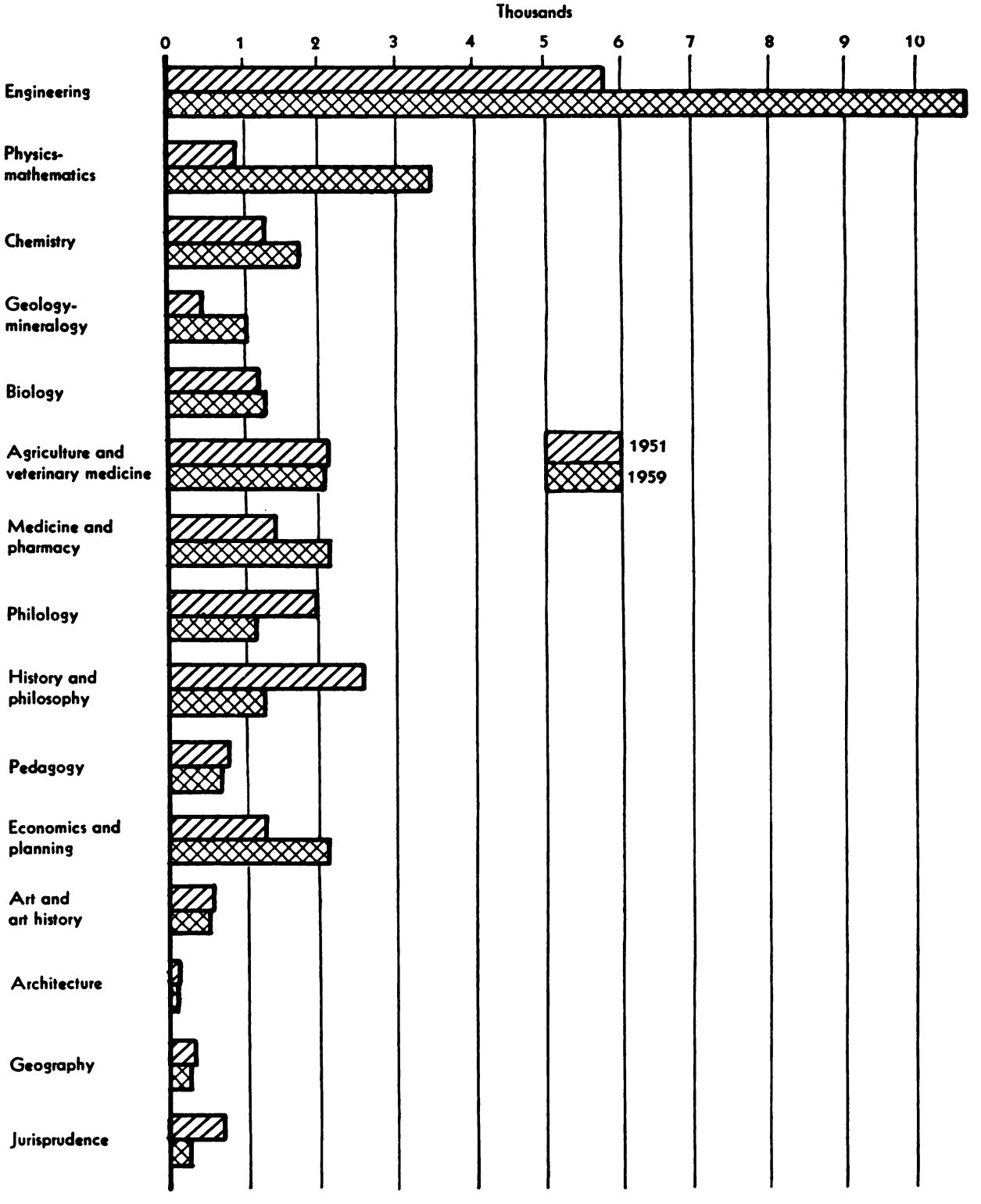
CHART XXVII.—COMPARISON OF NUMBER OF ASPIRANTURA STUDENTS BY FIELD, 1951 AND 1959



Source: Appendix table V–A–2.

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dissertation; in 1939 only about 37 percent (902 out of 2,447) did so; and in 1946 the figure was only about 24 percent.[81] The situation was about the same in the early 1950's. In 1951 only 25 percent of those who "completed" aspirantura training defended a dissertation on time; in 1952 the percentage was 25.3 and in 1953 it was 35.3. During the 3-year period 1951-53, about 13,000 persons "completed" aspirantura training.[82] Thus two significant points must be stressed. First, aspirantura training may be "completed" (i.e., a person terminates his studies usually in 3 years, or 1 year after taking the candidate minimum examinations) without defense of a dissertation. Second, probably only about one-third of advanced students defend a dissertation in the specified time.

In order to clarify further the success rate of advanced students, one specific academic year will be considered. The data in table V–5 show the structure of aspirantura enrollment in higher educational establishments in 1946–47; about 17 percent of the total enrollment (9,500)

TABLE V–5.—*Distribution of aspirantura students in Soviet higher educational establishments, by year of study, 1946–47*

Year of study	Total number (approximate)	Distribution in percent
First	3,590	37.4
Second	2,800	30.0
Third	2,700	28.1
Fourth or over	430	4.5
Grand total	9,520	100.0

Source: Sinetskii, *PP Kadry*, pp. 183, 187. These data refer to higher educational establishment aspirantura students only and exclude those in research institutes.

either left before the completion of study (1,100)—mostly during the second or third year—or "completed" study without defending a dissertation (500). On the basis of this information the rate of success, i.e., the proportion of advanced degree students both completing aspirantura training and defending a dissertation, can be determined for 1946–47 as somewhere between 20 and 30 per 100 entering students.

[81] *Ibid.*, pp. 184–86.

[82] These figures are from *VVSh*, No. 10, October 1952, p. 38; No. 5, May 1954, p. 31.

For the year 1953 it was similarly reported that only about 30 percent of the aspirantura students who had begun their training three years earlier "completed" it by writing and defending a dissertation.[83] The remaining 70 percent either dropped out or "completed" their training without defending a dissertation.

Such a low success rate is subject to several interpretations. On the one hand, it may be stated that aspirantura students either were not well enough prepared or did not realize what was expected of them.[84] On the other hand, it would appear that the training was fairly stringent, and the principle of selection was enforced. Both interpretations are valid and, to some extent, complementary. Both are confirmed by frequent Soviet press reports complaining about poor preparation, lack of interest, the desire to get the degree without a sincere interest in a research career, etc., and by contradictory reports stating that aspirantura training is too difficult and demanding.

Whatever the reasons, the statistical evidence clearly indicates that in the 1940's and early 1950's less than one-third of aspirantura students completed their training to the point of defending a candidate degree thesis.[85]

Unfortunately, recent Soviet official sources have not given comprehensive data on acceptances for aspirantura training. The only way we can judge the "success" rate of aspirantura students is to compare the enrollment with the "completion" of the training. This is done in table V–6, showing the computed rate of completion of aspirantura training in any given year compared to the total enrollment in aspirantura programs in that year. The data show a considerable "improvement" in the annual flows of completion throughout the period 1940–55, but a reversal in the trend in 1959. If we assume that the average length of training is ideally three years, then on the basis of these annual flows of aspirantura completions, we may say that in 1940 only about three out of ten students succeeded in completing training. By

[83] *Ibid.*, No. 2, February 1953, p. 23.

[84] There are occasional stories in Soviet newspapers to this effect. See, for example, *Pravda*, Dec. 7, 1953; Jan. 9, 1954.

[85] It is interesting to compare such low success rates in aspirantura programs with graduation rates in higher education, where 70 percent of the students who embark upon professional training are graduated and get their diplomas.

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TABLE V–6.—*Annual rates of completion of aspirantura training in relation to total aspirantura enrollment, 1940–59*

Year	Total			Regular			Extension-correspondence		
	Enrollment (thousands)	Graduations	Percent	Enrollment (thousands)	Graduations	Percent	Enrollment (thousands)	Graduations	Percent
	Total: higher educational establishments and research institutes								
1940	16.9	1,978	11.7	14.4	1,865	12.9	2.5	113	4.5
1945	9.8	1,366	13.9	8.7	1,221	14.0	1.1	145	13.2
1950	21.9	4,093	18.7	18.1	3,649	20.2	3.8	444	11.7
1955	29.4	7,607	25.9	21.4	6,536	30.5	8.0	1,071	13.4
1959	28.6	5,603	19.6	18.6	4,089	22.0	10.0	1,514	15.0
	Higher educational establishments only								
1940	13.2	1,472	11.1	11.5	1,411	12.2	1.7	61	3.6
1945	6.9	1,200	17.4	6.1	1,092	17.9	.8	108	13.5
1950	12.5	2,461	19.7	11.2	2,281	20.4	1.3	180	13.8
1955	16.8	4,752	28.3	13.2	4,263	32.3	3.6	489	13.6
1959	15.6	3,330	21.2	10.8	2,585	24.0	4.8	745	14.6
	Research institutes only								
1940	3.7	506	13.7	2.9	454	15.7	.8	52	6.5
1945	2.9	166	5.7	2.6	129	5.0	.3	37	12.3
1950	9.4	1,632	17.4	6.9	1,368	19.8	2.5	264	10.6
1955	12.6	2,855	22.7	8.2	2,273	27.7	4.4	582	13.3
1959	13.0	2,273	17.7	7.9	1,504	19.0	5.1	769	15.7

Source: Appendix table V–A–1.

1955 the success rate had increased to approximately 6 or 7 out of 10. In 1959 the rate was about 5 out of 10. Obviously these rates are crude, but little else can be done for lack of acceptance data for most years. It should be noted that the completion (flow) rates to enrollment (stock) of aspirantura students in regular (full-time) programs are invariably higher than those for extension-correspondence programs. Also for all years the rate of completion in relation to enrollment is higher in higher educational than in research establishments.

We must look now at the other side of this question. It has been pointed out that many candidate degrees are awarded to persons who have not enrolled in aspirantura programs at any time. Aspirantura training is the formal way of preparing advanced students for the candidate degree, but it is not the only way. On the basis of the data available, about one-half of all candidate degrees awarded by higher educational establishments prior to 1947 went to persons who had not taken formal aspirantura training.

Among those receiving a candidate degree from higher educational establishments prior to January 1947, anywhere from 23 to 61 percent, depending upon the field, had completed aspirantura training. The highest proportion, as might be expected, was in the fields of philosophy and philology (61 percent) and history (58 percent); the lowest was in medicine (23 percent).[86] In engineering, about 36 percent of candidate degree holders had had formal aspirantura training. The proportion was lower in applied fields, engineering, and sciences because research performed elsewhere could be considered an equivalent substitute and because teaching appointments and academic degrees in applied fields were more frequently made without aspirantura training than was the case in social sciences and humanities.

In 1948, of the total number of candidate degrees, 35 percent went to those who had taken aspirantura training and 65 percent to those who had not.[87] The respective proportions of candidate degrees earned by persons who had not had aspirantura training were 54.9 percent

[86] Sinetskii, *PP Kadry*, p. 180.
[87] Galkin, *Nau Kadry*, p. 138.

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in 1949, 48.0 percent in 1950, and 49.0 percent for the period 1951–53.[88] In other words, the data indicate that about one-half of those who actually defended candidate theses in the pre-1953 period had not taken formal aspirantura training at all. It is possible that during the peak years of awards (i.e., 1953–56) some of the past aspirantura trainees had "caught up," prepared their theses and got their degrees (see table V–7), and thus the proportion of persons with former aspirantura training among the total was higher in the mid-1950's than in the earlier period.

It must be stressed again that the candidate degree has been and may still be awarded to persons who have not actually written and defended a dissertation. This practice was typical in the late prewar years (1937–41), when degrees were first granted on a large scale. In 1941, for example, out of some 3,000 "awarded" candidate degrees, only about 1,700, or 56 percent, were obtained as a result of the defense of a dissertation.[89] The rest were "awarded" on individual merit. This was the situation immediately after the decree of January 1934, when large numbers of scholars and scientists of recognized stature who held senior teaching or research posts were accorded degrees and ranks on the basis of merit. It is known that such practice is still being followed, but to what extent is not ascertainable.

The recent (1956–60) changes in the candidate degree award procedures might possibly raise the number of degrees conferred on the basis of merit, though the formal procedures for the dissertation defense are intended to be followed and thus the share of candidate degrees conferred after dissertation defense will probably remain about the same.

Any statement regarding the award of candidate degrees, then, must be qualified. With the help of the preceding observations we hope to show how radically different the awarding of advanced degrees in the Soviet Union is from that anywhere else.

To sum up, it appears that only about one-third of those who take and complete aspirantura training write and defend a dissertation within the specified time of 3 years. If those who take aspirantura training and then at some later date receive a candidate degree are included, the proportion increases to about 60 percent. About one-half of the candidate degrees in all fields were, up to 1953, awarded to persons who had not taken formal training. Prior to 1947 about one-third of all candidate degrees were awarded without the defense of a dissertation but on the basis of individual merit. In recent years the number of persons receiving candidate degrees who have taken formal aspirantura training and have made formal defense of a thesis has been rising.

In conclusion, table V–7 presents data on "graduations" from aspirantura training in a given year and compares the figures with the award of candidate degrees in the same years. "Graduation" is the "successful" completion of aspirantura training. It does not depend on the award of the candidate degree, though of course some students defend a thesis. It is interesting to observe that for most years for which we have actual data, the number of candidate degrees *exceeds* the number of aspirantura completions. This is not so peculiar as it might seem at first glance, for we know that the actual award of the candidate degree is not necessarily related to the completion of aspirantura training, and that many times those who complete

TABLE V–7.—*Relationship between the completion of aspirantura training and the award of candidate degrees, 1940–59*

Year	Aspirantura completion	Award of candidate degrees
1940.....	1,978	4,287
1945.....	1,366	1,952
1946.....	1,616	3,188
1947.....	2,730	3,500
1948.....	3,328	4,000
1949.....	4,582	7,530
1950.....	4,093	4,536
1951.....	4,895	5,464
1952.....	5,682	5,000
1953.....	6,495	8,530
1954.....	6,796	12,842
1955.....	7,607	11,800
1956.....	8,453	7,800
1957.....	8,250	3,500
1958.....	6,802	5,000
1959.....	5,603	5,700

Source: Appendix tables V–A–1 and V–A–3.

[88] *Idem.*

[89] *VVSh*, No. 10, October 1946, p. 47; S. V. Kaftanov, *Zadachi vysshei shkoly* (The Task of Higher Education), Moscow, 1944, p. 22.

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aspirantura training do not get the degree until several years after the 3 years of study. These data help to show, however, how numerically divergent the two procedures can be—and, for most years—especially the mid-1950's—are. The result of the tightening of the degree award procedures after 1956 was that for three years thereafter the number of persons receiving candidate degrees was substantially smaller than the number of persons completing aspirantura training in any given year. In 1959 the number of aspirantura completions and of actual candidate degree awards was about the same.

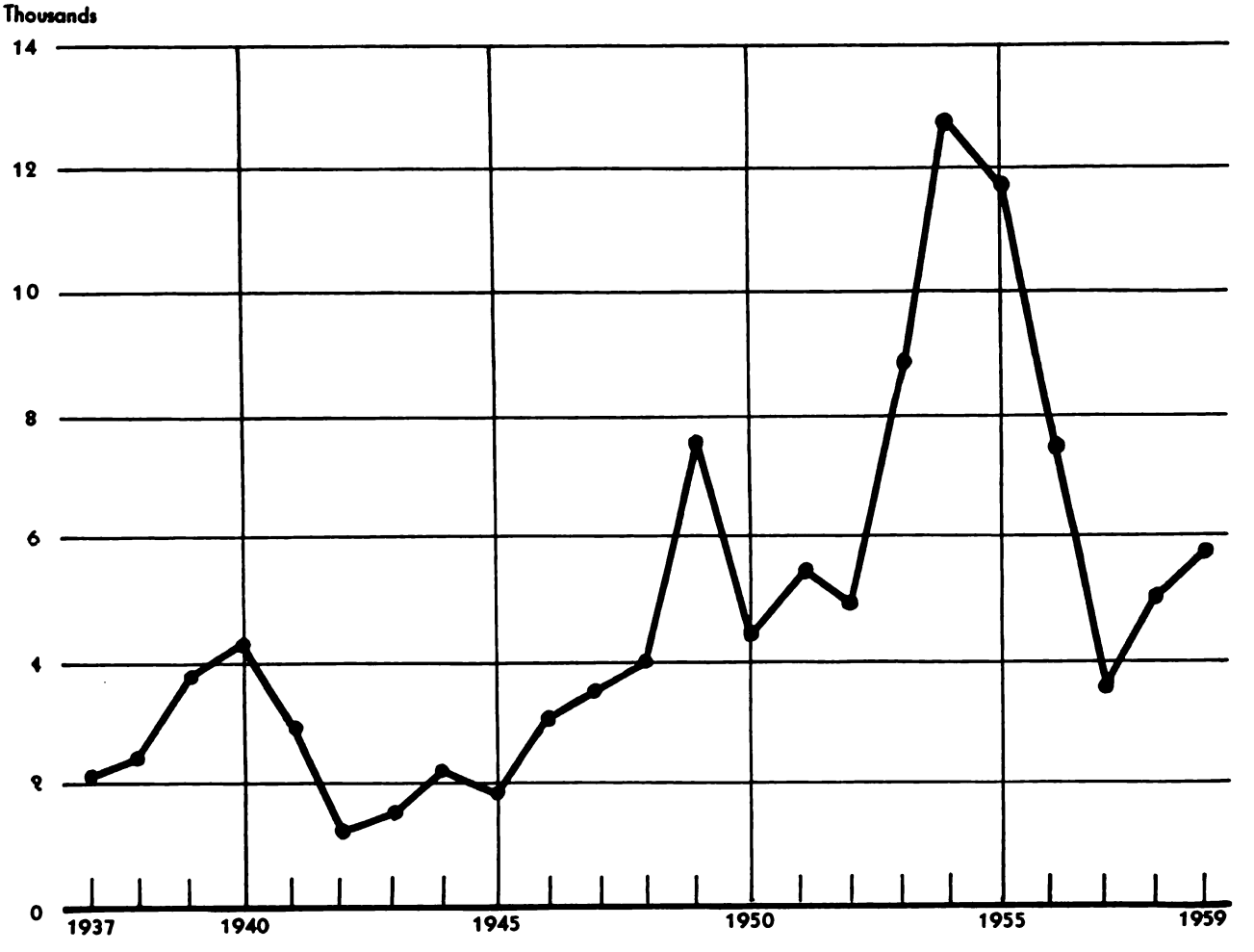
3. *Candidate Degrees*

Keeping in mind all of these factors which explain the significance of "awarded" candidate degrees, we can briefly analyze the trend in awarding these degrees, total and by field. Chart XXVIII shows the trend in the total award of candidate degrees during the years 1937–59. During this period 110,679 candidate degrees were awarded, for an annual average of 4,812.[80]

Since candidate degrees were instituted in 1934, the number of degrees awarded annually

[80] Appendix table V–A–3.

CHART XXVIII.—AWARD OF FIRST ADVANCED DEGREE, CANDIDATE IN SCIENCE, 1937–59



Source: Appendix table V–A–3.

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shows extremely erratic behavior. It is probable that prior to 1937 one can hardly speak of "earned" degrees (i.e., by the defense of a dissertation), whereas the relative share of actually earned degrees among all degrees awarded has continued to increase throughout the years. In the late 1930's the annual number of candidate degrees awarded doubled—from 2,099 in 1937 to 4,287 in 1940.

The conferring of candidate degrees fell off during the war, but in the late 1940's there was an accelerated phase; degrees rose to the level of 7,500 in 1949. Between 1950 and 1952 the number dropped to an annual level of about 5,000, under the impact of tightening standards. A new accelerated phase occurred during 1953–55, with the all-time peak of almost 13,000 candidate degrees awarded in 1954. This was a "mopping-up" period, when candidate degrees were given to many who had worked for years on theses but never had defended them. It was also the period of their highest prestige as tools to status advantage. Again, it was probably a period of low standards and laxity precipitating the reaction in 1956–60. The renewed tightening of the standards plunged the number of candidate degree awards to its postwar low in 1957, when only 3,500 degrees were given. Thus, from 1954 to 1957 there was a 3.5-fold cutback in the annual number of awards. Thereafter a new phase of gradual upswing occurred, and in 1959 the number of candidate degree awards increased to about 5,700.

In pointing out these ups and downs, it has to be emphasized that this zigzag behavior is not so much a reflection of the natural trend of study-research-thesis defense as of a wholly artificial and politically dictated accreditation policy. It is not that the academic councils of Soviet higher educational and research establishments could not gradually step up the normal process of annual degree awards but that they are under pressure at one time to "go easy" and pass on as many degrees as possible and at another to "go hard" and to "strengthen the standards."

The cycles indicate the arbitrariness and lack of genuine spontaneity of the Soviet advanced degree training process. Furthermore, one gets the definite impression of an "overproduction" pattern. Sudden bursts of "quickie" candidate degree awards create a glut in terms of available job vacancies, for every new candidate degree holder expects a better job; the state must then call for a slowdown so that the artificially created surplus can be dissipated before a new burst of expansion begins.

The pattern of candidate degree awards suggests that much of the Soviet talk about how advanced degree training is "thoroughly planned," with each school knowing exactly how many and what kind of personnel are required years in advance, is questionable. Aside from the setbacks caused by World War II, if there were any comprehensive long-range plans, instead of the artificial "go fast" and "go slow" policy, we would never have a cycle such as that observed in the late 1940's and 1950's. The up-and-down cycle in the award of candidate degrees parallels that of aspirantura enrollment. Thus, while we observe a rather steady expansion in teaching and research staffs during the postwar period, the award of candidate degrees (and aspirantura training itself) in relation to this expansion was completely erratic, an indication of dependence upon bureaucratic certification policies rather than actual staff requirements.

An interesting and important question concerns the distribution of candidate degree holders by field. In our earlier study we were handicapped by the lack of data. Using an elaborate estimating procedure,[91] we were able to determine that between 1925 and 1946 only 60 percent of those who had completed aspirantura training defended dissertations and got candidate degrees sometime thereafter. Furthermore, it was observed that about 75 percent of all candidate degrees were in the fields of the physical sciences, engineering, and the biological sciences, the remaining 25 percent being in the humanities, the arts, and the social sciences. Official Soviet releases in the late 1950's confirmed these trends. The recent availability of data obviate the need for elaborate estimates, and appendix table V–A–4 summarizes the official Soviet statistics on the award of candidate degrees in 18 specialty fields for the period 1937–55. These data, grouped by branch of knowledge, are summarized in table V–8, which also presents estimates of the number of degrees

[91] *SPM*, pp. 208–10, especially table 3, p. 209.

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awarded by branch in 1956–59. It may be observed that over two-thirds of all the candidate degrees awarded were in scientific fields. However, the physical and biological sciences lost ground in proportionate terms between 1951 and 1955, though in numerical terms they showed a steady gain. During the period 1956–59 the proportion of degrees awarded in the physical and biological sciences showed an increase, although in numerical terms the number declined probably because of the restrictive award policies.

TABLE V–8.—*The award of candidate degrees by branch and period, 1937–59*

Field of award	Periods									
	1937–40		1941–45		1946–50		1951–55		1956–59[a]	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Physical sciences and engineering.	5,276	42.0	4,397	45.2	9,973	43.8	16,700	38.3	8,560	38.9
Biological sciences and medicine.	5,656	45.1	3,621	37.2	7,048	31.1	12,202	27.9	6,580	29.9
Humanities and social sciences.	1,447	11.6	1,652	17.0	5,664	24.9	14,101	32.4	6,530	29.7
Other and residual[b]	174	1.3	66	.6	69	.2	633	1.4	330	1.5
Total	12,553	100.0	9,736	100.0	22,754	100.0	43,636	100.0	22,000	100.0
Annual average award in all fields	3,138	.....	1,947	.....	4,550	.....	8,727	.....	5,500	.....

[a] These figures were derived on the basis of the distribution of the *net* increment in the number of degrees awarded (11,999 in appendix table V–A–4), obtained as a difference in the stock of candidate degree holders as of Oct. 1, 1955 and Oct. 1, 1958, by projecting this distribution upon the estimated total number (22,000 in appendix table V–A–4) of candidate degrees awarded during the period 1956–59.

[b] Includes other miscellaneous fields (about 1.1 percent of the total for the entire period) and a minor statistical discrepancy.

Source: Appendix table V–A–4, which also presents data for the 18 individual fields comprising the branches indicated above.

On the basis of these data, we have to make two additional comments concerning the trend in aggregate degree awards. For the period 1937–59 the distribution of candidate degrees by period in which they were granted is shown in table V–9. The data reveal that 59.3 percent of all candidate degrees were awarded in the 1950's. A particular acceleration took place in the early 1950's, when 39.4 percent of all the candidate degrees awarded during the last two decades were granted. It is to be noted further (table V–8) that the cutbacks in the number of awards in recent years (1956–59) reduced the average annual number (5,500) by approximately one-third as compared with the period 1951–55, when an average of 8,700 degrees were awarded per year.

TABLE V–9.—*Distribution of candidate degree awards by period, 1937–59*

Period	Number of degrees	Percent
1937–40	12,553	11.3
1941–45	9,736	8.8
1946–50	22,754	20.6
1951–55	43,636	39.4
1956–59	22,000	19.9
Total	110,679	100.0

Source: Appendix tables V–A–3 and V–A–4.

The data in table V–8 also reveal that during the various periods the emphasis in candidate degree awards by field has been changing significantly. To begin with, in the late 1930's the biological and medical sciences accounted for the highest proportion of all candidate degree awards. Later, the proportion of degrees in these fields declined. Physical sciences and engineering showed some fluctuation in the proportion of degrees awarded, but it was not so significant as for other fields. Although the proportion of candidate degrees awarded in the physical sciences and engineering has fallen

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somewhat in the 1950's as compared with the preceding periods, these fields continue to account for about 39 percent of all the candidate degrees awarded. Through the years we notice an increase in the proportion of degrees awarded in the humanities and social sciences, from approximately 12 percent in the late 1930's to 32 percent in the early 1950's. However, the sharpest reversal took place during the period 1956–59, and the numerical rate of candidate degree awards fell off most (by 2½ times) in the humanities and the social sciences, while in other fields the decline was less pronounced (about twofold). As a result, the humanities and social science fields again began to lose ground proportionally in the late 1950's. These recent trends coincide remarkably with a similar orientation, i.e., increasing emphasis on the engineering-industrial branch, in both higher and secondary specialized education since the mid-1950's.

In addition to presenting data on the flow of candidate degree awards by field and period during 1937–55, appendix table V–A–4 compares them with the stock of candidate degree holders at the end of 1955. This comparison allows us to estimate the attrition rate for candidate degree holders in the U.S.S.R. over a span of 18 years. The attrition during this period was 12 percent of the new flow of candidate degrees for all fields. It was slightly lower in the physical sciences and engineering (9 percent) and higher in the biological sciences and medicine (16 percent). In the humanities and social sciences, attrition during this period was about 12 percent. It is important to observe that these attrition rates for candidate degree holders are substantially lower than for Soviet professionals and semiprofessionals, among whom almost one-third of the new additions were dissipated to cover losses over the 30-year period 1927–57.

Chart XXIX presents data on the total stock —93,999—of candidate degree holders in the Soviet Union, by field, as of October 1959. One-fourth of all candidate degrees were awarded in engineering. The second most sizeable field was medicine, with almost 16 percent of the total. All science fields combined accounted for almost three-quarters of the candidate degree holders in the country. As of October 1, 1960, there were 98,300 candidate degree holders,[91a] with the distribution by field remaining about the same as in 1959.

It was stated earlier that the author is extremely wary of making qualitative comparisons between Soviet candidate degrees and American Ph.D.'s or science doctorates. Quantitative comparisons, however, are meaningful insofar as they are indicative of the weight assigned to various fields in the two countries. It is therefore well worth mentioning that while about 75 percent of all Soviet candidate degrees are earned in scientific fields, only 40 percent of American advanced degrees are earned in scientific fields.[92]

4. *Doctor Degrees*

Appendix table V–A–3 presents a summary of the data on the Soviet higher advanced degree of doctor. Chart XXX shows graphically the trend in the annual award of doctor degrees in the U.S.S.R. During the period 1937–59, 12,585 doctor degrees were awarded, for an average of 543 doctorates per year.

It may be recalled that doctor degrees are either earned by public defense of a dissertation or awarded on a merit basis. The data in chart XXX cover both practices for the years in question. In 1940 the number of doctor degrees awarded was 978, the highest figure ever reached.

It should be noted particularly that the granting of doctor degrees without defense of a dissertation was extensive after the recognition of advanced degrees in the mid-1930's. From 1934 to 1936, about 80 percent of all doctor degrees were granted on merit. This rate declined to 30 percent in the late 1930's, and to 10 percent during the Second World War. To summarize:[93]

Period	Doctor degrees awarded without defense of a dissertation, in percent of all doctor degrees awarded
1934–36	81.5
1937–39	30.0
1940–45	10.3

There are no statistics for later years of what

[91a] *SSSR–Tsif–1960*, p. 315.

[92] See further quantitative comparisons in: U.S. Congress, Committee on Appropriations, *Comparison of United States and U.S.S.R. Science Education*, 86th Cong., 2d sess., Washington, D.C.: U.S. Government Printing Office, 1960 (National Science Foundation report).

[93] Sinetskii, *PP Kadry*, p. 152.

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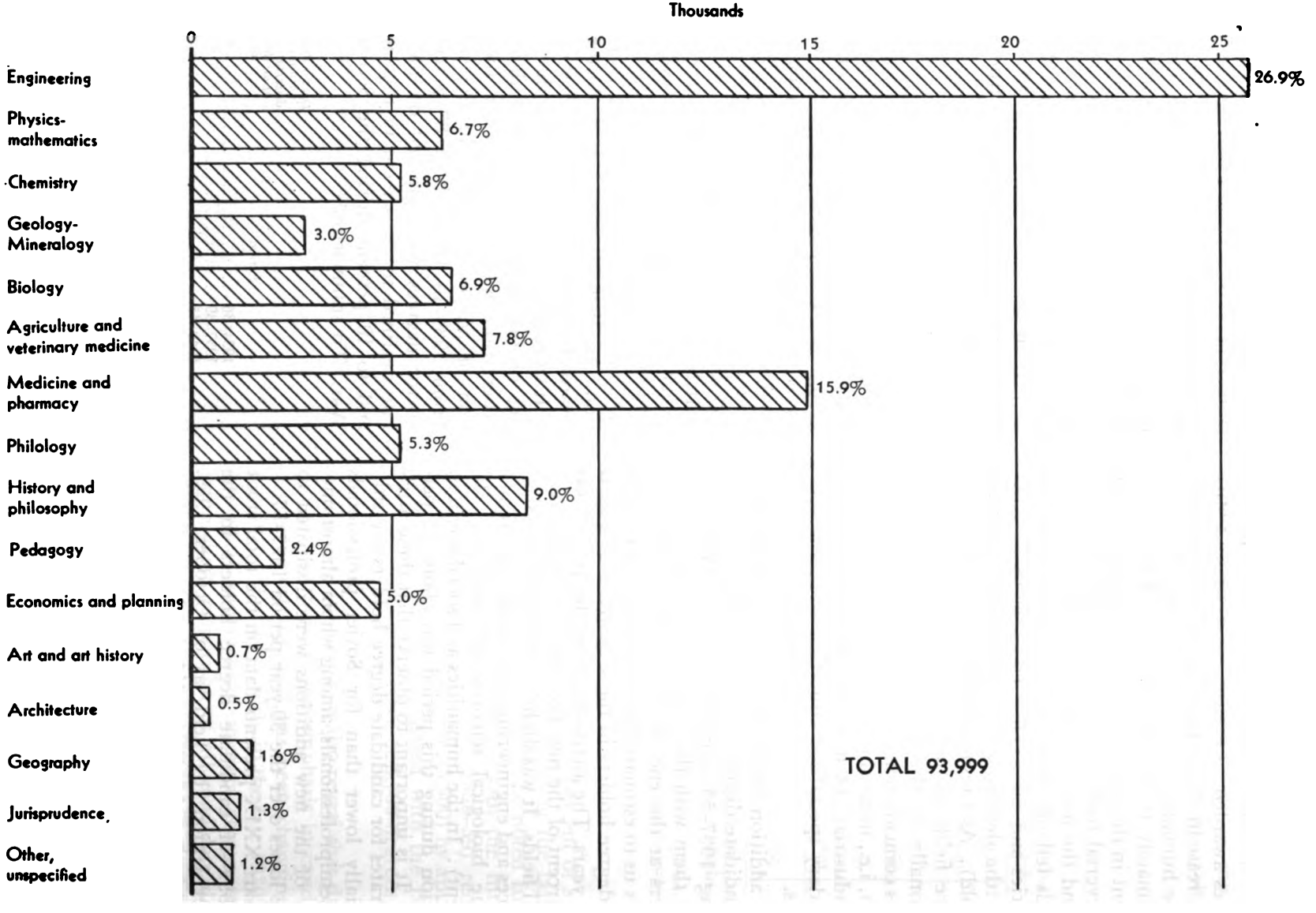
CHART XXIX.—NUMBER OF CANDIDATE DEGREE HOLDERS AND DISTRIBUTION BY FIELD AS OF 1959



Source: Appendix table V–B–5.

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proportion of doctor degrees were granted without defense of a dissertation. It is conceivable, however, that since 1956, when doktorantura training was abolished, merit awards may have become more frequent. In addition, the 1960 regulations emphasize merit award procedures, which leads us to believe there may be an increase in the number of doctor degrees awarded without defense of a dissertation.

Appendix table V–A–5 presents data on the number of doctor degree awards in 18 different specialty fields during various periods between 1937 and 1955. It also compares this flow of doctorates with the stock at the end of 1955 and so allows us to estimate that the attrition rate constituted about 11 percent of the flow during the 18-year period. This is remarkably similar to the candidate degree rate. The pattern by field among doctor degree awards is also comparable to that for candidates, the attrition rate in physical sciences and engineering being slightly lower (8 percent) than that for all fields combined. Table V–10 summarizes these data by field and period.

Among the doctorates the heavy bulge of awards in the early 1950's noted for candidate awards is absent, and only about 27 percent (2,886) of all doctorates (10,674) were awarded in the 1951–55 period, as compared with 39 percent for candidate degree awards. Thus the doctor degree accreditation has proceeded much more smoothly over the last two decades than has candidate degree accreditation. As with candidate degree awards, however, the physical science and engineering fields were the dominant component. In proportionate terms the biological and medical fields continued to lose ground over the period. The humanities and social sciences gained some ground in the late 1950's, but for the entire 22-year period, awards in these fields constituted only about 15 percent of all doctor degrees.

TABLE V–10.—*The award of doctor degrees by branch and period, 1937–59*

Branch	Periods									
	1937–40		1941–45		1946–50		1951–55		1956–59[a]	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Physical sciences and engineering	873	32.3	928	39.4	1,123	41.5	1,198	41.6	860	45.0
Biological sciences and medicine	1,560	57.7	1,124	47.2	1,158	43.2	1,293	45.0	680	35.5
Humanities and social sciences	269	10.0	319	13.4	415	15.3	388	13.4	374	19.5
Other (unaccounted residual)	1	.....	9	.....	9	.....	7	.....	.....	.....
Grand total	2,703	100.0	2,380	100.0	2,705	100.0	2,886	100.0	1,914	100.0
Annual average award in all fields	676	.....	476	.....	541	.....	577	.....	478	.....

[a] The 1956–59 distribution by field has been estimated on the basis of the proportion of *net* additions of doctorates (822 in appendix table V–A–5) by field during the period to the estimated total number of doctorate awards during this period (1,914 in appendix table V–A–5).

Sources and Notes: Appendix table V–A–5, which also presents data on the award of doctorates in 18 individual fields.

Significantly, very few holders of the doctor degree hold the first advanced degree of candidate. Out of the total number of doctor degrees awarded between 1938 and 1946 (about 5,200), only 14 percent, or about 740, were granted to persons already holding the candidate degree. Thus, although theoretically the two degrees are sequential, in reality only a small fraction of the holders of the higher advanced degree have acquired the lower one.[94] This appears to have been the situation up to 1947. We do not have aggregate data to demonstrate numerically that the awarding of doctor degrees without the previous degree of candidate has continued in recent years. Interesting data are available, however, for Moscow State University, where

[94] *VVSh*, No. 11, Nov. 1947, pp. 32–33.

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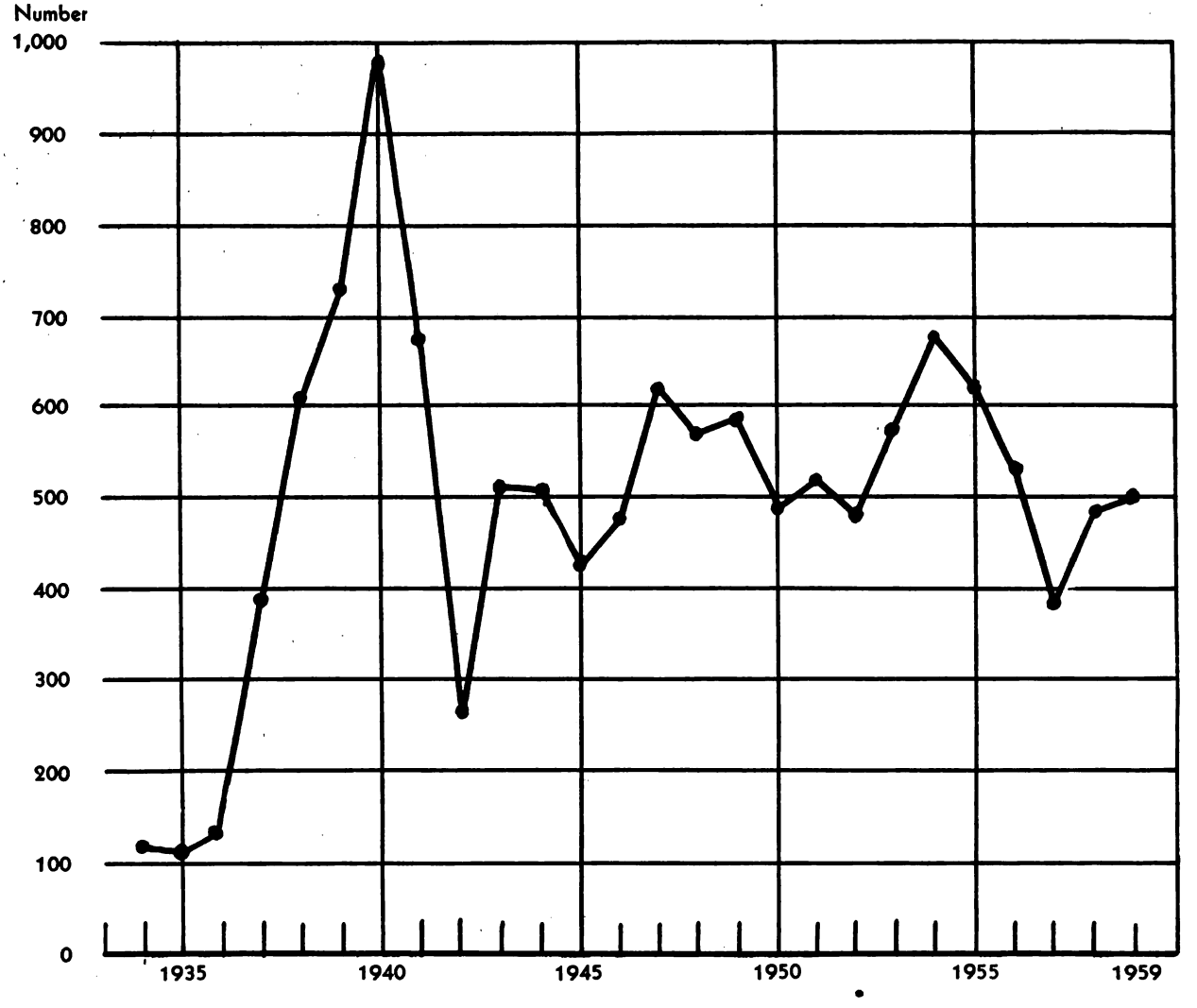
CHART XXX.—AWARD OF SECOND ADVANCED DEGREE, DOCTOR OF SCIENCE, 1934–59



Source: Appendix table V–A–3.

among 2,184 candidate and doctor degrees in the natural sciences awarded in 1934–54 there were 386 doctorates, and among these only 64 persons, or about 16 percent, already held a candidate degree.[95]

Chart XXXI presents data on the total stock —10,530—of doctor degree holders by specialty field in the U.S.S.R. as of October 1959. The largest field was medicine, which accounted for 27 percent of all doctor degrees. Engineering accounted for 20 percent, and all scientific fields combined for 86.6 percent, a concentration even more pronounced than that in the case of candidate degrees (73.9 percent). As of October 1, 1960, there were 10,900 doctor degree holders,[95a] with the distribution by field about the same as in 1959.

5. *Social Profile of Advanced Degree Recipients*

A significant question still facing us is the relationship of the two advanced degrees to pro-

[95] Moskovskii Gosudarstvennyi Universitet, *Doktorskie i kandidatskie dissertatsii: 1934–54, passim.*

[95a] *SSSR—Tsif—1960,* p. 315.

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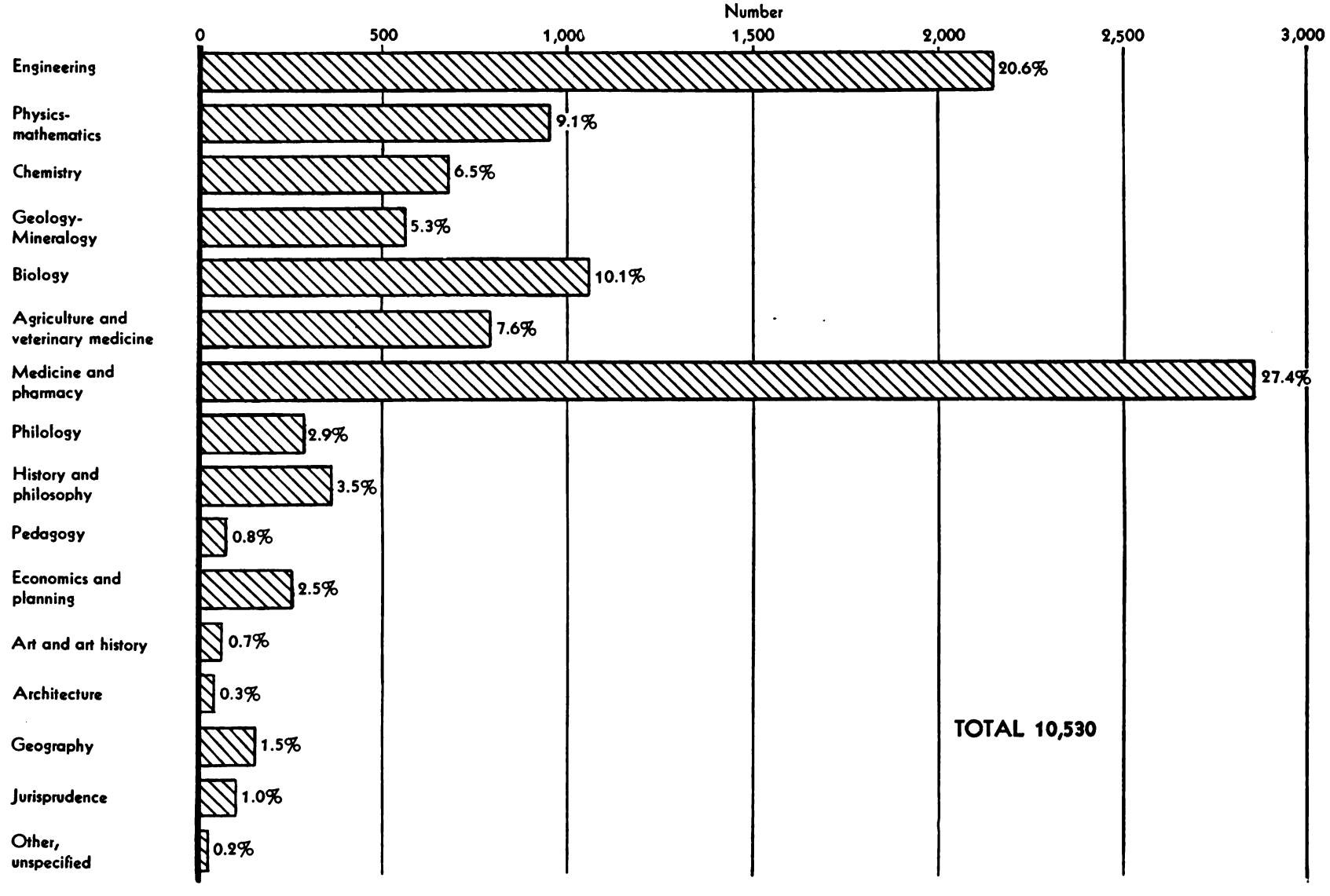
CHART XXXI.—NUMBER OF DOCTOR DEGREE HOLDERS AND DISTRIBUTION BY FIELD AS OF 1959



Source: Appendix table V–B–5.

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fessional higher education. Of fundamental importance is how long it takes to become an advanced degree holder after the completion of higher education. In 1947 about one-third of advanced students continued their training without interruption between higher education and advanced degree training.[96] The proportion probably increased in the early 1950's. Since 1956 there has been a change in policy, and most advanced degree students are required to have a gainful employment record before entering aspirantura training.

It has already been pointed out that only about one-third of aspirantura students obtain the candidate degree in the specified time (three years). Usually the time which actually elapses between the completion of higher education and the awarding of advanced degrees is much longer. Under normal circumstances a successful student completes his higher education at the age of 22 or 23. From information concerning acceptances, it is obvious that the majority, i.e., some 70 percent, began aspirantura training before the age of 30.[97] About 60 percent of these entering students had had three or more years of employment elsewhere. Thus Soviet students in general embarked upon an advanced degree training program at a later age than in the United States, and frequently after some employment experience.

In 1947, among those who had both advanced degrees, 65.6 percent had received the candidate degree 10 or more years after graduation from a higher educational establishment, and 72.8 percent had received the doctor degree 15 or more years after graduation from a higher educational establishment.[98] How much longer than 10 or 15 years it took some of these individuals to get an advanced degree is not known. This great delay between the completion of higher education and the award of an advanced degree, though unusual in American education, is not uncommon in other European countries.

The data for the postwar period indicate clearly that similar trends have continued. Table V–11 summarizes data on the age of candidate degree recipients at the time of the award. The median age of candidates at the time of the degree award was about 38. Thus even in fairly recent years Soviet candidates received their degrees at a significantly more mature age than is the case in the United States, where the mean age of Ph.D. recipients at the time of the award in biological, behavioral, and physical sciences was 31.5 years.[99] It is also to be noted that the mean number of years' lapse between the first degree (usually the bachelor degree) and a science doctorate in America was 8 years, of which a median of 3 years was devoted to professional experience. Comparable statistics for the Soviet Union can be ascertained if we assume that the normal age at the time of graduation from a higher educational establishment is 23. Then the time lapse between the completion of professional education and the award of the advanced degree would be about 15 years, or roughly twice that in the United States. In the Soviet case the intervening period is devoted primarily to professional activity, i.e., gainful employment.

This is a further indication of the difference in the role which advanced degrees play in the two countries. To some extent the delay in the Soviet Union is caused by an individual's difficulty in escaping the work requirement immediately upon the completion of higher education and, once work has been begun, by the difficulty in getting a release to return to academic work. Finally, the factor of "accomplishment" is also important. While aspirantura training may be

TABLE V–11.—*Age of candidate degree recipients at the time of the award, 1946–53*

Age	Candidate degrees	
	Number	Percent
Under 30	6,029	13.9
30–39	20,163	47.1
40–49	12,460	28.6
50–59	3,816	8.8
60 and older	656	1.6
Total	43,574	100.0

Source: Galkin, *Nau Kadry*, p. 163.

[96] Sinetskii, *PP Kadry*, pp. 154–57.

[97] Entering aspirantura students in 1947 were distributed as follows: younger than 25, 28.4 percent; 25–29, 41.6 percent; 30–35, 19.2 percent; over 35, 10.8 percent. Sinetskii, *PP Kadry*, p. 184.

[98] Sinetskii, *PP Kadry*, pp. 155–56.

[99] L. R. Harmon, *The Science Doctorates of 1957 and 1958*, Office of Scientific Personnel, National Academy of Sciences–National Research Council, Washington, D.C., Mar. 17, 1959, p. 27.

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undertaken by many, the actual award of degrees is made in recognition of certain research achievement, which in many instances can be accomplished only after years of study and research. This latter factor is particularly significant in the case of doctor degrees.

Table V–12 provides information on the age distribution of persons at the time the doctor degree was received for two periods— 1937–46 and 1947–55. The median age of the Soviet doctor degree recipient was about 52 years dur-

TABLE V–12.—*Age distribution of recipients of doctor degrees at the time of the award, 1937–46 and 1947–55*

Age at time of degree award	Distribution by age, in percent	
	1937–46[a]	1947–55[b]
Under 30	0.1	0.3
30–39	6.0	14.5
40–49	36.0	48.2
50–59	33.6	29.2
60–65	11.1	7.8
Over 66	13.2	
Total	100.0	100.0

[a] This distribution refers to about 5,200 doctor degrees awarded during the period 1937–46 (Sinetskii, *PP Kadry*, p. 157).
[b] This distribution refers to 5,093 doctor degrees awarded during the period 1947–55 (Galkin, *Nau Kadry*, p. 163).

ing the period 1937–46 and 47 years during the period 1947–55. Thus, although the median age was somewhat lower in the later period, the Soviet doctor degree is awarded at such an advanced age that it certainly cannot be viewed in any sense as a "prerequisite" for a career; rather it is an indicator of the culmination point in a career. The obvious conclusion is that all Soviet advanced degree holders are "overaged" in comparison with American or with a great many West European advanced degree holders, and that there is an undeniable conservatism involved in the award of these degrees in the Soviet Union.

It was indicated in chapter IV that women comprise about 52 percent of Soviet higher education graduates. Interestingly, the proportion of women among aspirantura students has been steadily declining in the postwar period.[1] In 1947, 41 percent; in 1950, 39 percent; and in 1955, 31 percent of all aspirantura students were women. This decline may probably be attributed not only to the postwar stabilization of male attendance in aspirantura training but also to the fact that advanced research and teaching careers are relatively less accessible to women.

[1] *KS–1956*, p. 251.

Composition of Research and Academic Personnel (RAP)

It is very difficult to be precise in defining staffs engaged in higher education teaching, research and development in any country, for there are different classifications and reporting methods involved. While the Soviet Union is not an exception, three decades of experience with planning and normative staffing procedures have reduced the confusion somewhat. There are, nonetheless, inter-institutional differences in reporting which present some difficulty, in addition to inconsistencies in definitions and reporting practices over time. These difficulties must be kept in mind when discussing the complex pattern of employment of specialized personnel in Soviet academic and research institutions.

Soviet sources[2] distinguish six main categories of employees in academic and research establishments, as follows:

Higher Education

1. Academic and teaching staffs (*professorsko-prepodavatel'skie rabotniki; kadry; sostav*)
2. Supporting teaching and laboratory personnel (*uchebno-vspomogatel'nyi personal*)
3. Workshop and production personnel (*uchebno-proizvodstvennyi personal*)
4. Administrative and clerical personnel (*administrativno-upravlencheskii personal*)
5. Library staffs (*bibliotechnye rabotniki*)
6. Maintenance, buildings and grounds service personnel (*obsluzhivaiushchii personal*)

Research Establishments

1. Research staffs (*nauchnye sotrudniki; nauchnye rabotniki*)
2. Supporting laboratory personnel (*nauchno-vspomogatel'nyi personal*)

[2] See especially *VyShkoSPR–1957*, pp. 352–92; and L. Potekhin *et al.*, *Planirovanie raskhodov na soderzhanie ucherezhdenii prosveshcheniia i zdravookhraneniia* (Planning of Expenditures for Education and Public Health), Moscow, 1955, pp. 137–44.

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3. Technical and research aid staffs (*nauchno-tekhnicheskii personal*)
4. Administrative, managerial and clerical staffs (*administrativno-khoziaistvennyi personal*)
5. Library staffs (*bibliotechnye rabotniki*)
6. Maintenance, buildings and grounds service personnel (*obsluzhivaiushchii personal*)

The most abundant information in primary sources deals with the first of these six categories of employment,[3] i.e., the academic and teaching staffs in higher education and research staffs in research establishments, or *RAP*.

By Soviet definition,[4] *RAP* includes: all academicians, i.e., members and corresponding members of all types of academies; all persons holding either the candidate or doctor degree; all persons having the academic or research rank of professor, associate professor, assistant professor, senior research associate, and junior research associate, irrespective of place of employment; and, in addition, all persons conducting research in research establishments or teaching in higher educational establishments irrespective of their academic degrees or academic or research rank.

The trouble with this definition is that Soviet sources do not differentiate in their statistics on *RAP* between the people holding full-time jobs and those holding part-time jobs. A person holding an advanced degree and/or academic rank but *not* employed full-time in research or a higher educational establishment is included in the *RAP* category. Many persons counted as *RAP* hold jobs in more than one establishment. However, the number of actual full-time job holders in the *RAP* category is available for only a few years and only for higher educational establishments.[5]

For example, in January 1947, an actual census count disclosed that there were 67,300 *RAP* employed in Soviet higher education.[6] If multiple-job holders are added, however, the figure would increase to 74,400. Again, the total number of *RAP* in higher educational establishments in 1954 was 114,200; however, the full-time job holders numbered only 86,000, so that 25 percent of all higher education staffs were composed of persons holding more than one job.[7]

Multiple-job holding (*sovmestitel'stvo*) has always been a problem in Soviet higher education.[8] In 1956 it was officially decreed that it be "drastically curtailed," [9] and allowed only as an exception. Nevertheless a survey in 1958 revealed that the number of academic personnel holding more than one job continued to be "high," [10] and it was reported in 1959 that multiple-job holding was particularly prominent in "independent" extension-correspondence and evening institutes, with up to half of the staff multiple-job holders (*sovmestiteli*).[11] A similar situation held true for research establishments and "some research associates of the Academy of Sciences," it was reported in 1959, "work in three institutions at the same time." [12]

Soviet statistics on *RAP*, however, do not take into account the number of multiple-job holders, but merely use the term "number of persons" (*chislennost'*, or *tysiach chelovek*), so that it is impossible to know how much, if any, double counting is involved, or whether a classification by major job held on the staff of a higher educational or research establishment precludes such double counting.[13] Official statistical reporting is said to be based on the "personnel cards" of *RAP* kept in the central file of the *VAK* and other "central administrations where research and academic personnel

[3] In the late 1950's the total employment in all categories combined was also given. See tables VI–70 through VI–73.
[4] *NarKhoz–1960*, p. 847.
[5] See col. E in appendix table V–B–1.
[6] Sinetskii, *PP Kadry*, pp. 105–06.
[7] Appendix table V–B–1.
[8] In 1931, for instance, over one-half of all higher education teachers held more than one job. Sinetskii, *PP Kadry*, p. 79.
[9] *Pravda*, July 7, 1956 (Eliutin article); *VyShkoSPR–1957*, pp. 359–61.
[10] *VVSh*, No. 6, June 1959, pp. 74–76.
[11] *Ibid.*, No. 7, July 1959, p. 95.
[12] *Partiinaia zhizn'*, No. 12, 1959, p. 21 (a special article denouncing *sovmestitel'stvo*, listing the names of specific scientists of the Academy of Sciences of the U.S.S.R. who were involved).
[13] A related problem concerns figures for advanced degrees. Soviet sources have stated that at year-end 1946 there were about 26,000 candidate degree holders and 6,000 doctor degree holders in the U.S.S.R. (see *SPM*, p. 254). Another Soviet source (*VVSh*, No. 9, Sept. 1948, p. 27—report by Danilov, recording secretary of the *VAK*) stated that prior to January 1958 the total number of candidate degrees *awarded* was 28,400 and doctor degrees, 6,500. *KS–1956*, p. 248, however, put the number of actually employed *RAP* with a candidate degree at 36,900, and with a doctor degree at 7,700 as of October 1, 1947. This is most peculiar, since it seems to say that there were more people with advanced degrees employed than the total number of such degrees awarded. Two possibilities exist. Either the *VAK* reporting did not give full coverage or in some cases when the two advanced degrees were awarded sequentially (that is, the doctor degree was awarded to those already holding the candidate degree) they were both counted.

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are employed," [14] which submit annual reports (as of October 1) to the Central Statistical Administration on the number and composition of research and academic personnel—total, by field, and by academic rank and advanced degree. Beginning in 1957 a copy of this report was also submitted to the Ministry of Higher and Secondary Specialized Education, which is in charge of the planning and placement of *RAP* in higher educational establishments. Thus the *VAK* and the other agencies process figures each fall so as to provide national reporting as of October 1 of a given year.[15] Conceivably such a procedure could result in a count of the actual number of persons classified as *RAP*, but one cannot practically rule out the possibility that multiple-job holders may be double-counted since they would appear in more than one register as a person classified under *RAP*. These uncertainties notwithstanding, an analysis of the data on *RAP* which are available reveals many interesting aspects concerning the utilization of advanced personnel in Soviet higher education and the national research effort.

Appendix table V–B–3 provides data on the composition of *RAP*, total and number and distribution of advanced degree holders by specialty field as of 1955. The physical and biological sciences together accounted for about 69 percent of all *RAP*, 87 percent of all doctor degree holders, and 73 percent of all candidate degree holders. While the humanities and social sciences accounted for about 28 percent of all *RAP*, there were disproportionately fewer advanced degree holders in these fields—about 13 percent of doctor degree holders and less than 26 percent of candidate degree holders.

Within the humanities and social sciences, jurisprudence accounted for the largest proportion of advanced degree holders among *RAP* in this field (5.7 percent of the doctor and 63.9 percent of the candidate degree holders). Within the biological sciences, medical and pharmaceutical sciences accounted for the largest share of advanced degree holders among *RAP* in these fields (11 percent of the doctor and 49 percent of the candidate degree holders). The proportion of advanced degree holders among *RAP* was lowest in art and art history (2 percent doctor and 15.4 percent candidate degree holders), and, particularly, pedagogy (0.6 percent doctor and 16.8 percent candidate degree holders).

In each of the biological science fields, doctor degree holders accounted for a higher proportion among *RAP* than the proportion of doctor degree holders among *RAP* in all fields (i.e., biology—8.6; agricultural and veterinarian—4.8; medical and pharmaceutical—11.0 percent of the doctor degree holders among *RAP*; total for all fields—4.2). In the physical sciences, engineering, physical-mathematical, and chemistry fields the proportion of advanced degree holders was lower than for all fields, with only geology-mineralogy accounting for a higher proportion.

Table V–13 provides information on the distribution of *RAP* by type of advanced degree as of 1955, grouped by place of employment in various types of institutions in the U.S.S.R. The year 1955 is the only one for which such detailed information is available. As shown in column A, about one-half of all *RAP* were employed in higher educational establishments, one-third in research establishments, and almost 10 percent in the research academies of the Soviet Union (i.e., the Academy of Sciences of the U.S.S.R. and the academies of sciences of the union republics). Less than 4 percent were employed in enterprises, government administration, party, trade union and other organizations.

A second observation is that among the total 224,000 *RAP*, only 4.2 percent held the doctor degree, and about 35 percent held the candidate degree. The remaining 61 percent presumably had professional higher education.[16] Thus in 1955 more than 60 percent of all *RAP*, including of course those teaching in higher education, did not have advanced degrees. While higher educational establishments employed about half of all *RAP*, they employed 58.6 percent of all persons holding a doctor degree and

[14] K. N. Bukhman, *Statistika podgotovki spetsialistov* (Statistics on the Training of Specialists), Moscow, 1960, p. 5.

[15] A. *Ezhov, Organizatsiia gosudarstvennoi statistiki v SSSR* (Organization of Statistical Reporting in the U.S.S.R.), Moscow, 1957, p. 117.

[16] Many official regulations state that *RAP*, from junior research associates up, should have had at least professional higher education. This does not mean, however, that all higher education graduates employed in research and higher educational establishments are classified as *RAP*. As of Dec. 1, 1959, there were 449,000 professionals employed in all types of research establishments, while the number counted as *RAP* was only 165,000 (*NarKhoz–1960*, pp. 605, 754).

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TABLE V–13.—*Distribution of RAP by place of employment and by advanced degree as of Oct. 1, 1955*

Place of employment	A		B		C		D	
	Total *RAP*		With doctor degree		With candidate degree		Without advanced degree	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Academy of Sciences of the U.S.S.R.	13,009	5.8	1,317	13.9	4,975	6.4	(6,717)	4.9
Percent	100.0	.....	10.1	.....	38.2	.....	51.7	.....
Academies of sciences of the union republics	7,993	3.6	484	5.1	3,826	4.9	(3,683)	2.7
Percent	100.0	.....	6.0	.....	47.9	.....	46.1	.....
Research establishments other than those under the jurisdiction of the academies of sciences	75,509	33.7	1,727	18.3	18,797	24.1	(54,985)	40.3
Percent	100.0	.....	2.3	.....	24.9	.....	72.8	.....
Higher educational establishments	119,059	49.6	5,547	58.6	43,450	55.8	(70,062)	51.4
Percent	100.0	.....	4.7	.....	36.5	.....	58.8	.....
Enterprises, government administration, party, trade-union and other organizations[a]	8,323	3.7	385	4.1	6,913	8.8	(1,025)	.7
Percent	100.0	.....	4.6	.....	83.1	.....	12.3	.....
Total	223,893	100.0	9,460	100.0	77,961	100.0	136,472	100.0
Percent	100.0	.....	4.2	.....	34.8	.....	61.0	.....

[a] Includes only those holding advanced degrees or academic rank appointment.

Source: *KS–1956*, p. 249. Numbers in col. D in parentheses derived as a residual—col. A minus cols. B and C.

55.8 percent of those holding a candidate degree. The academies of sciences, employing 9.4 percent of all *RAP*, accounted for 19 percent of the doctor and 11.3 percent of the candidate degree holders. Other research establishments, employing 33 percent of the *RAP*, accounted for only 18.3 percent of the doctor and 24.1 percent of the candidate degree holders.

By definition the *RAP* employed in enterprises, etc. should be composed only of advanced degree holders (4.6 percent doctors and 83.1 percent candidates, and the 12.3 percent without advanced degrees presumably held academic rank). But in research and academic establishments proper the highest proportion of advanced degree holders were employed as teaching personnel in higher education. Looking at the composition of *RAP* within the establishments, we observe that the largest share of advanced degree holders (6.0 percent doctors and 47.9 percent candidates) was among *RAP* employed in the academies of the union republics. This was followed by the Academy of Sciences of the U.S.S.R. (10.1 percent doctors; 38.2 percent candidates), higher educational establishments (4.7 percent doctors; 36.5 percent candidates), and, lastly, by other research establishments (2.3 percent doctors; 24.9 percent candidates).

Table V–14 provides data on the place of employment of *RAP* candidate degree holders according to their academic rank as of 1955. It is surprising to note that the largest proportion of candidate degrees (45.3 percent) were held by persons *not* of high academic rank but in the residual category of "other" nonranking *RAP*. Of further interest is the fact that over one-half (43,450) of those with a candidate degree were employed in higher educational establishments.

The two specific academic rank groups (i.e., exclusive of the "other" category) which had the largest share of candidate degree holders were senior research associates (16.6 percent) and associate professors (32.1 percent). Of the latter, 90 percent were employed in higher educational establishments. Two-thirds of the senior research associates were employed in research establishments and a quarter of them in

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TABLE V–14.—*Distribution of RAP candidate degree holders by place of employment and academic rank as of Oct. 1, 1955*

Place of employment		Professors		Senior research associates		Associate professors (*dotsent*)		Junior research associates		Assistant professors		Other		Total	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Academy of Sciences of the U.S.S.R.	Number.	18	3.6	1,996	15.5	154	.6	255	11.6	10	.5	2,542	7.2	4,975	6.4
	Percent..	.4	.....	40.1	.....	3.1	.....	5.1	.....	.2	.....	51.1	.....	100.0	.....
Academies of sciences of union republics	Number.	11	2.2	1,477	11.4	245	1.0	429	19.5	3	.1	1,661	4.7	3,826	4.9
	Percent..	.3	.....	38.6	.....	6.4	.....	11.2	.....	.1	.....	43.4	.....	100.0	.....
Research establishments	Number.	88	17.5	8,279	64.0	1,054	4.2	1,399	63.7	54	2.6	7,923	22.5	18,797	24.1
	Percent..	.5	.....	44.0	.....	5.6	.....	7.4	.....	.3	.....	42.2	.....	100.0	.....
Higher educational establishments	Number.	342	68.0	647	5.0	22,500	90.0	73	3.3	1,791	87.7	18,097	51.3	43,450	55.8
	Percent..	.8	.....	1.5	.....	51.8	.....	.2	.....	4.1	.....	41.6	.....	100.0	.....
Enterprises, etc.	Number.	44	8.7	529	4.1	1,065	4.2	42	1.9	187	9.1	5,046	14.3	6,913	8.8
	Percent..	.6	.....	7.6	.....	15.5	.....	.6	.....	2.7	.....	73.0	.....	100.0	.....
Total.....	Number.	503	100.0	12,928	100.0	25,018	100.0	2,198	100.0	2,045	100.0	35,269	100.0	77,961	100.0
	Percent..	.6	.....	16.6	.....	32.1	.....	2.8	.....	2.6	.....	45.3	.....	100.0	.....

Source: *KS–1956*, p. 249.

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the various academies of sciences. A final observation on the data in table V–14 is the extremely low proportion of candidate degree holders among full professors, in sharp contrast to the proportion of doctor degree holders among this rank (see below).

Table V–15 provides similar data for *RAP* doctor degree holders. Over 80 percent of the doctor degree holders were full professors, two-thirds of them employed in higher educational establishments. Some 10 percent of the doctor degree holders were senior research associates, half of them employed by the Academy of Sciences of the U.S.S.R. and 36 percent of them by other research establishments. Among "other academic ranks" only 9 percent held a doctor degree; half of this group were employed in higher educational establishments.

Table V–16 provides 1955 data on *RAP* with academic rank only (i.e., nonranking *RAP* are excluded) by place of employment correlated with advanced degrees held. The data indicate that of the total number of *RAP* (224,000–table V–13), 4 percent held the rank of professor, 6.5 percent senior research associate, 12.8 percent associate professor, and 7.6 percent junior research associate or assistant professor. Thus the vast majority, or 69.1 percent, were nonranking teaching or research personnel. The data also indicate a very high correlation between advanced degree and senior academic rank. Among some 9,000 full professors, 90.2 percent had either the candidate (503) or doctor (7,589) degree, the overwhelming majority of these the doctor degree. Among some 14,600 senior research associates, 95.5 percent had either the candidate (12,928) or doctor (657) degree, the overwhelming majority of these the candidate degree. Among some 28,600 associate professors 89 percent had either the doctor or candidate degree, the vast majority the candidate degree.[17]

Historical Trend in Number and Composition of RAP

For most other years (except for 1955 discussed above), Soviet sources have provided data on *RAP* by field, academic rank and advanced degree, but not on their composition by type of institution. The aggregate data which are available are presented in appendix tables V–B–1 through V–B–5, and from these data the historical trend in the composition of *RAP* can be ascertained, particularly for the period 1947–60.

1. *Growth of Total Number of RAP in Higher Educational and Research Establishments*

The total number of *RAP* in 1914 was officially

[17] Among nonranking teaching and research personnel (155,000) about 23 percent (36,000) held an advanced degree, most of them candidate degrees.

TABLE V–15.—*Distribution of RAP doctor degree holders by place of employment and academic rank as of Oct. 1, 1955*

Place of employment		Professors[a]		Senior research associates		Other academic ranks		Total	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Academy of Sciences of the U.S.S.R.	Number	753	9.9	510	50.5	54	6.3	1,317	10.1
	Percent	57.2	.....	38.7	.....	4.1	.....	100.0	.....
Academies of sciences of the union republics	Number	375	4.9	76	7.5	33	3.8	484	5.1
	Percent	77.5	.....	15.7	.....	6.8	.....	100.0	.....
Research establishments	Number	1,169	15.5	365	36.1	193	22.4	1,727	18.3
	Percent	67.7	.....	21.1	.....	11.2	.....	100.0	.....
Higher educational establishments	Number	5,070	66.8	37	3.7	440	51.1	5,547	58.6
	Percent	91.4	.....	0.6	.....	8.0	.....	100.0	.....
Enterprises, etc.	Number	222	2.9	22	2.2	141	16.4	385	4.1
	Percent	57.7	.....	5.7	.....	36.6	.....	100.0	.....
Total	Number	7,589	100.0	1,010	100.0	861	100.0	9,460	100.0
	Percent	80.2	.....	10.7	.....	9.1	.....	100.0	.....

[a] Includes members and corresponding members of academies.

Source: *KS–1956*, p. 249.

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TABLE V–16.—*Distribution of RAP by place of employment, according to academic rank, Oct. 1, 1955*

Place of employment	Degree held	Professors	Senior research associates	Associate professors (*dotsent*)	Junior research associates	Assistant professors
Academy of Sciences of the U.S.S.R.	Doctor	753	510	(?)	(?)	(?)
	Candidate	18	1,996	154	255	10
	None	3	56	5	460	5
	Total	774	2,562	.....	.....	.....
Academies of sciences of union republics	Doctor	375	76	(?)	(?)	(?)
	Candidate	11	1,477	245	429	3
	None	4	15	12	820	3
	Total	390	1,568	.....	.....	.....
Research establishments	Doctor	1,169	365	(?)	(?)	(?)
	Candidate	88	8,279	1,054	1,399	54
	None	55	446	90	6,917	43
	Total	1,312	9,090	.....	.....	.....
Higher educational establishments	Doctor	5,070	37	(?)	(?)	(?)
	Candidate	342	647	22,500	73	1,791
	None	717	64	2,580	244	3,926
	Total	6,129	748	.....	.....	.....
Enterprises, etc.	Doctor	222	22	(?)	(?)	(?)
	Candidate	44	529	1,065	42	187
	None	96	76	393	303	157
	Total	362	627	.....	.....	.....
Total	Doctor	7,589	1,010	(a)	(b)	(c)
	Candidate	503	12,928	25,018	2,198	2,045
	None	875	657	3,080	8,744	4,134
	Total	8,967	14,595	.....	.....	.....
Reported grand total	.....	9,000	14,600	28,600	17,000	
Percent	.....	4.0	6.5	12.8	7.6	

[a,b] and [c] combined, as a residual, equal 861; [a] as a residual is 502; [b] and [c] combined are none (17,100 minus 17,121). This is not inconsistent; it implies that there were about 500 associate professors with the doctor degree and some 360 doctor degree holders among persons of lower teaching and research rank, or even among [b] and [c].

Source: *KS–1956*, p. 248. All other academic and research appointments of lower rank and not specified above number 154,600, or 69.1 percent of the total *RAP* (223,900).

reported to be 10,200. This figure refers to the actual number of persons employed in senior academic and research ranks only in the higher educational and research establishments of Imperial Russia. What the aggregate number of research and academic personnel would be according to later Soviet definitions cannot be reliably determined, though it was probably two or three times greater. By 1929 there were 45,500 persons classified as *RAP*, this figure including, however, multiple-job holders. Between 1929 and 1931 the number of *RAP* doubled (1931—100,000) according to official statistics; but this doubtless was largely a fictitious increase because of double-counting of multiple-job holders and because of reclassifications of categories. In 1940, by more rigorous and consistent criteria, there were still 98,300 persons counted as *RAP*. It is important to note that in all post-1956 Soviet statistical releases no figures for *RAP* prior to 1940 are given at all, an indication, perhaps, that Soviet authorities are themselves not entirely certain about the consistency of the earlier reporting with the postwar classification. The 1940 figure and those from 1947 on are probably fairly consistent according to the classification used after World War II.

During the last two decades the number of

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RAP has more than tripled, from 98,300 in 1940 to 354,200 at the end of 1960.[18] The greatest increase took place in the 1950's, from 162,500 in 1950 to 354,200 in 1960. In the late 1950's additions were 25,000 to 35,000 per annum.

Between 1940 and 1960 the distribution of *RAP* changed significantly. As shown by the data in table V–17, the proportion of *RAP* employed in higher education declined from 62 to 41 percent over the 20-year period. In 1960 research establishments accounted for 56.5 percent of all *RAP*.[19] Unless there is a major reorganization of the Soviet research effort, consolidating it with higher education, it is probable that this trend will continue.

TABLE V–17.—*Number and proportion of RAP employed in higher education, 1940–60*

Year end	Total number of *RAP* (thousands)	Number in higher educational establishments	
		Thousands	Percent of total
1940.....	98.3	61.4	62.4
1947.....	145.6	81.5	56.0
1950.....	162.5	86.5	53.2
1955.....	223.9	132.3	53.2
1959.....	310.0	137.8	44.4
1960.....	354.2	146.9	41.5

Source: *SSSR–Tsif–1960,* p. 315. Appendix tables V–B–1 and V–B–2; *Pravda,* Jan. 26, 1961.

2. *Number of Advanced Degree Holders among RAP*

Table V–18 summarizes the trend in the number and proportion of advanced degree holders among *RAP* over the last 20 years.

TABLE V–18.—*Number and proportion of advanced degree holders among RAP, 1940–60*

Year end	Total number of *RAP* (thousands)	Number with advanced degree			
		Advanced degree		With both or either degree	
		Doctor (thousands)	Candidate (thousands)	Number (thousands)	Percent of total
1940.....	98.3	2.7	12.5	15.2	15.5
1947.....	145.6	7.7	36.9	44.6	30.6
1950.....	162.5	8.3	45.5	53.8	31.1
1954.....	210.2	9.0	69.2	78.2	37.2
1955.....	223.9	9.5	78.0	87.5	39.1
1956.....	239.9	9.8	85.7	95.5	39.8
1957.....	262.0	10.0	87.2	97.2	37.1
1958.....	284.0	10.3	90.0	100.3	35.3
1959.....	310.0	10.5	94.0	104.5	33.7
1960.....	354.2	10.9	98.3	109.2	30.8

Sources: Appendix tables V–A–3, V–A–4, V–A–5, and V–B–1; *SSSR-Tsif–1958,* p. 363; *Dos–1957,* p. 284; *KS–1956,* p. 248; *NKh–1956,* p. 233; *NarKhoz–1960,* p. 755; *Pravda,* Jan. 26, 1961; *SSSR–Tsif–1960,* p. 315. For 1940 the number of advanced degree holders is assumed to be the same as the number of advanced degrees awarded during the period 1934-40.

The proportion of advanced degree holders among *RAP* increased steadily until 1956. In recent years, however, the number of advanced degree holders among *RAP* did not keep pace with the numerical increase of *RAP* themselves, and by 1960 the proportion of *RAP* holding advanced degrees had declined to 30.8 percent from the high for the period of 39.8 percent in 1956.

3. *Advanced Academic Rank and RAP*

Table V–19 presents data on the proportion of *RAP* holding advanced academic or research

TABLE V–19.—*Proportion of total number of RAP holding advanced academic rank, 1947–60*

Year end	Total number of *RAP* (thousands)	Percent of *RAP* holding title of—			
		Professor	Associate professor	Senior research associate	Junior research associate, assistant professor, and lower nontitled academic rank
1947.....	145.6	6.1	13.9	6.7	73.3
1950.....	162.5	5.5	13.4	7.0	74.1
1955.....	223.9	4.0	12.8	6.5	76.7
1959.....	310.0	3.2	11.1	5.9	79.8
1960.....	354.2	2.8	10.3	5.7	81.2

Source: Appendix table V–B–2; *SSSR–Tsif–1960,* p. 315.

[18] *Pravda,* Jan. 26, 1961; *SSSR–Tsif–1960,* p. 315.

[19] Appendix table V–B–2. The remaining 2 percent were employed outside of research or higher educational establishments.

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TABLE V–20.—*Number, composition by field, and factor of growth of RAP in the U.S.S.R., 1955 and 1959*

Field	Total number of *RAP*			Number with doctor degrees			Number with candidate degrees			Number without advanced degrees		
	1955	1959	Factor of growth*	1955	1959	Factor of growth*	1955	1959	Factor of growth*	1955	1959	Factor of growth*
Physical sciences and engineering... thousands	103.3	163.5	1.59	3.8	4.4	1.16	32.9	39.9	1.20	66.6	119.3	1.78
percent	46.0	52.7	.....	40.0	41.5	.....	42.2	42.4	.....	48.8	58.0	.....
Biological sciences, medicine and agriculture thousands	51.5	64.8	1.21	4.5	4.7	1.04	24.0	28.7	1.19	23.0	31.4	1.40
percent	23.0	20.9	.....	47.1	45.1	.....	30.8	30.5	.....	16.8	15.3	.....
Arts, humanities and social sciences. thousands	62.6	74.4	1.19	1.2	1.4	1.16	20.1	24.3	1.21	41.3	48.8	1.17
percent	27.9	24.0	.....	12.7	13.2	.....	25.8	25.8	.....	30.3	23.8	.....
Other thousands	6.5	7.2	1.10	.02	.02	1.00	.9	1.2	1.33	5.6	6.0	1.07
percent	2.9	2.4	.....	.3	.2	.....	1.2	1.2	.....	4.1	2.9	.....
Total thousands	223.9	310.0	1.38	9.52	10.52	1.10	77.9	94.0	1.21	136 5	205.4	1.50
percent	100.0	100.0	.....	100.0	100.0	.....	100.0	100.0	.....	100.0	100.0	.....

* Ratio of 1959 to 1955.
Source: Appendix tables V–B–3 and V–B–5. For data on individual fields within the three main groupings, see the appendix tables.

rank. In the 13-year period covered (1947–60), there has been a steady and substantial decrease in the relative proportion of senior academic and research rank appointees among the total number of *RAP*, although there were some numerical increases as follows:

	1947	*1959*	*1960*
Professors	8,900	9,700	9,900
Associate professors	20,200	34,300	36,200
Senior research associates	9,800	18,400	20,300

Again, as in the case of the number of advanced degree holders among *RAP* since 1956, the proportion of those holding advanced academic rank has not kept pace with the overall expansion in the total number of *RAP*.

4. *The Growth of RAP by Field*

Soviet sources have given data on the total number of *RAP* candidate and doctor degree holders by field of knowledge for 1955, 1958, and 1959,[20] but similar data for earlier years were not found.[21] Table V–20 summarizes the data for 1955 and 1959. During this four-year period the greatest rate of growth in the total number of *RAP* took place in the physical sciences and engineering fields (1959 figure was 159 percent of the 1955 figure), followed by the biological sciences, medicine and agriculture (121 percent), and by arts, the humanities and social sciences (119 percent). It should be noted, however, except for the arts, humanities and social sciences, where the factor of growth in the total number of *RAP* was 1.19 and of *RAP* candidate degree holders was 1.21, the number of advanced degree holders has *not* kept pace with the total expansion of *RAP* in the respective fields. In fact, physical sciences and engineering, which experienced the largest factor of growth (1.59) in the 4-year period, were also subject to the largest increase in the number of *RAP* who held no advanced degrees (growth factor of 1.78). Two explanations could be made. One might be the changing nature of the research activity in this, as in other fields, calling for increasing numbers of researchers in sup-

[20] See appendix tables V–B–3, V–B–4, and V–B–5.
[21] For higher educational establishments there are data on average annual rates of growth (in percent of an unspecified numerical base) of persons with candidate and doctor degrees, by field of knowledge, during the period 1937–46 (Sinetskii, *PP Kadry*, p. 159).

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porting roles. Second, the curtailment of advanced degree training discussed above and the recent conservatism in the award of advanced degrees may also have contributed to a situation whereby many persons with only professional higher education and not with advanced degree training have entered the research ranks. The proportion of *RAP without* advanced degrees by field as of 1959 was as follows:

TABLE V–21.—*Proportion of RAP without advanced degrees, by field, 1959*

Fields	*Proportion without advanced degrees*
Physical sciences and engineering	72.9
Engineering	74.4
Physics-mathematics	70.9
Chemistry	72.8
Geology-mineralogy	62.3
Biological sciences, medicine and agriculture	48.4
Biology	44.8
Agriculture-veterinary medicine	60.0
Medicine-pharmacy	42.5
Arts, humanities and social sciences	65.5
Philology	72.8
History-philosophy	49.8
Pedagogy	82.5
Economics-planning	59.6
Arts	84.3
Architecture	63.7
Geography	56.3
Jurisprudence	36.5
Other	83.8
All fields	66.3

Source: Appendix table V–B–5.

Thus except for the *RAP* in the individual fields of jurisprudence, biology, medicine and history-philosophy, the overwhelming majority of *RAP* at the end of 1959 were persons *without* advanced degrees.

5. *Geographic Distribution of RAP*

Table V–22 presents information on the number of *RAP* employed in the 15 union republics of the U.S.S.R. for various years. The data show that there was a marked concentration of *RAP* employed in the Russian SFSR. Even in 1940 63 percent of all *RAP* were employed in the Russian SFSR; by the end of 1959 the proportion had increased to over 68 percent. In 1959 also 68 percent (64,492) of all candidate degree holders and 73 percent (7,695) of doctor degree holders were employed in the Russian SFSR.[22]

There is an even more marked pattern of concentration of *RAP* employment if we consider the two major cities of the Soviet Union, Moscow and Leningrad. These two cities, at the time of the award or appointment, accounted for the following proportion of the total number of doctor degrees, and of appointment to the rank of professor and associate professor during the period 1951–55:[23]

	Doctor degrees	*Professors*	*Associate professors*
Moscow	41.4	42.3	30.0
Leningrad	16.0	16.2	15.4

Similarly, at the end of 1956 the city of Moscow alone accounted for 27 percent (69,200) of the

[22] *NarKhoz–1960*, p. 758. See also the discussion of regional employment patterns in ch. VI.
[23] Galkin, *Nau Kadry*, p. 168.

TABLE V–22.—*Geographic distribution of RAP in the U.S.S.R., for selected years, 1940–59*

[In thousands]

Republic	1940	1950	1953	1956	1957	1958	1959
Russian SFSR	61.9	111.7	131.5	166.2	180.4	194.8	212.7
Ukrainian SSR	19.3	22.4	26.3	31.8	34.1	36.6	39.9
Belorussian SSR	2.2	2.6	3.3	4.4	5.1	5.5	6.0
Uzbek SSR	3.0	4.5	5.2	6.4	7.4	8.3	9.1
Kazakh SSR	1.7	3.3	4.0	5.4	6.2	7.8	8.4
Georgian SSR	3.5	4.8	5.3	5.9	6.8	7.5	7.9
Azerbaidzhan SSR	1.9	3.4	3.9	4.7	5.1	5.6	6.4
Lithuanian SSR	.6	1.4	1.8	2.2	2.3	2.5	2.8
Moldavian SSR	.2	.7	1.0	1.4	1.5	1.6	1.7
Latvian SSR	1.1	2.2	2.6	2.8	3.0	3.1	3.1
Kirgiz SSR	.3	.8	1.2	1.7	1.8	2.0	2.0
Tadzhik SSR	.4	.7	1.0	1.4	1.6	1.8	2.1
Armenian SSR	1.1	2.0	2.3	2.6	3.0	3.3	4.1
Turkmen SSR	.5	.7	1.0	1.3	1.4	1.5	1.7
Estonian SSR	.5	1.2	1.4	1.8	1.9	2.0	2.1
U.S.S.R. Total	98.3	162.5	191.9	239.9	261.6	284.0	310.0

Source: *NarKhoz–1959*, p. 847; *NarKhoz–1960*, p. 758.

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national stock of *RAP*.[24] Institutions in Moscow employed 39 percent (3,800) of the national total of doctor degree holders and 32 percent (27,400) of the national total of candidate degree holders.[25] In 1956 Leningrad accounted for 6 percent of the national total of *RAP*.[26] Thus these two cities, and Moscow primarily, accounted for over one-third of the entire nation's supply of *RAP* and advanced degree holders. Moscow and Leningrad are not only the major centers of higher education in the Soviet Union, but also of research and development activities. Efforts have been made to relocate research establishments in the manufacturing centers of the Urals, Siberia, southeastern Ukraine and Central Asia, but the indications are that a high concentration of research and academic personnel remains in the traditional centers.

6. *Social Profiles of RAP*

It was pointed out above that candidate and doctor degree recipients receive their degrees at a later age than those in many other countries. (See tables V–11 and V–12.) Similarly, as shown in table V–23, appointment to academic rank takes place at a later age. During the period 1947–55 the median age at the time of appointment to academic rank was 43 years for associate professors and 48 years for professors.

TABLE V–23.—*Age of recipients at the time of appointment to advanced academic rank, 1947–55*

Age	Associate professors		Professors	
	Number	Percent	Number	Percent
Under 30....	408	2.1	8	.02
31–40.....	7,767	38.4	552	12.2
41–50.....	7,891	39.5	2,116	46.6
51–60.....	3,309	16.6	1,357	30.08
Over 61.....	689	3.4	503	11.1
Total.	20,064	100.0	4,536	100.0

Source: Galkin, *Nau Kadry*, p. 163.

[24] *Moskva—Razvitie khoziaistva i kul'tury goroda* (Moscow—Development of the Economy and Culture of the City), Moscow, 1958, p. 98.
[25] *Idem.*
[26] *Narodnoe khoziaistvo goroda Leningrada* (National Economy of the City of Leningrad), Leningrad, 1957, pp. 131–32. Leningrad had 675 doctor and 4,285 candidate degree holders among its 14,700 *RAP*.

Table V–24 provides information on the number and distribution of appointments to advanced academic rank by period. If we consider these data together with the age at which advanced degrees and advanced academic appointments were made, it must be concluded that the overwhelming majority of Soviet advanced academic rank appointees (still active) are in their fifties or sixties.

TABLE V–24.—*Appointment of advanced academic rank by period, 1937–55*

Periods	Professors		Associate professors	
	Number	Percent	Number	Percent
1937–40.....	2,787	28.5	9,283	26.0
1941–45.....	1,823	18.7	5,104	14.2
1946–50.....	2,856	29.3	9,628	26.8
1951–55.....	2,290	23.5	11,855	33.0
Total.	9,756	100.0	35,870	100.0

Source: Galkin, *Nau Kadry*, p. 157.

Tables V–25, V–26, and V–27 provide information on the number and proportion of professors, associate professors, and doctor degree holders who were Communist Party members at the time of the appointment to advanced academic rank or award of the degree, for the period 1947–56. Approximately one-half of those who received doctor degrees or appointment to pro-

TABLE V–25.—*Number and proportion of professors who were Communist Party members at the time of their appointment, 1947–56*

Year	Number of professorships	Number of Communist Party members among the recipients[a]	Percent of total
1947....	650	207	31.8
1948....	543	209	38.5
1949....	596	247	41.5
1950....	499	206	41.4
1951....	506	235	46.5
1952....	408	205	50.4
1953....	399	226	56.9
1954....	591	304	51.5
1955....	386	225	58.4
1956....	423	248	58.6
Total.	5,001	2,312	46.5

[a] Candidate and full members of the Party.
Source: Galkin, *Nau Kadry*, p. 161.

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TABLE V–26.—*Number and proportion of associate professors who were Communist Party members at the time of their appointment, 1947–56*

Year	Number of associate professorships	Number of Communist Party members among the recipients[a]	Percent of total
1947....	2,600	937	36.0
1948....	1,696	872	51.5
1949....	2,089	1,110	53.2
1950....	1,824	1,006	55.0
1951....	2,067	1,212	58.5
1952....	2,029	1,269	62.4
1953....	2,294	1,417	61.9
1954....	3,241	1,985	61.2
1955....	2,224	1,362	61.3
1956....	2,613	1,568	60.0
Total.	22,647	12,738	56.0

[a] Candidate and full members of the Party.
Source: Galkin, *Nau Kadry*, p. 162.

TABLE V–27.—*Number and proportion of doctor degree holders who were Communist Party members at the time of the award, 1947–56*

Year	Number of doctor degrees awarded	Number of Communist Party members among the recipients[a]	Percent of total
1947....	621	194	31.1
1948....	557	205	36.8
1949....	566	233	41.3
1950....	492	230	46.8
1951....	529	241	45.5
1952....	475	244	51.5
1953....	569	306	54.0
1954....	663	372	56.0
1955....	621	338	54.5
1956....	539	293	54.5
Total.	5,632	2,656	47.5

[a] Candidate and full members of the Party.
Source: Galkin, *Nau Kadry*, p. 161.

fessor or associate professor were Communist Party members at the time the award was made. It is to be noted particularly that during the 10-year period (1947-56) there was a fairly steady increase in the proportion of professors, associate professors, and doctor degree holders who were Communist Party members at the time of the award from about one-third to well over one-half. The data do not show, of course, the number who joined the Party *after* appointment. No doubt, however, well over one-half of senior academic rank and doctor degree holders were Communist Party members in the late 1950's.

In 1955 43.2 percent of all *RAP* were Communist Party members, as compared with 34.5 percent in 1947 [27] and only 8 percent in 1927.[28] The integration of advanced academic rank appointees and advanced degree holders into the Communist Party intensified in the late 1930's. As of 1959 the integration of *RAP* and the advanced rank holders within it was more pronounced than for any other group among all Soviet professionals (25–30 percent).[29]

Appendix table V–B–6 presents data on the national composition of *RAP* for various years. If we compare the national composition of *RAP* in 1959 with the distribution of the Soviet population by nationality, we see that only six nationalities have a larger proportion of *RAP* than their respective share in the population, as indicated by the summary in table V–28.

TABLE V–28.—*Nationalities of the U.S.S.R. having a larger share of RAP than their respective share in the total population, 1959*

Nationality	Percent of representation in population (1959 census)	Percent of nationals among *RAP* (October 1959)
Russians....	54.9	64.5
Georgians...	1.2	2.4
Armenians...	1.4	2.2
Jews.....	1.1	9.8
Latvians....	.7	.8
Estonians...	.5	.6

Sources: Appendix table V–B–6 and text table VI–75.

The remaining ten major nationalities and all minor nationalities accounted for a smaller share among *RAP* than their respective share in the population.

The most striking statistics in table V–29 are those for Jews. In most Soviet statistical releases dealing with nationalities, Jews are not singled out in a separate reporting category but are included in the "unexplained residual." Actual figures for Jews alone, however, have been given in all post-1956 releases in connection with their

[27] Galkin, *Nau Kadry*, p. 162; *KS–1956*, p. 248.
[28] Sinetskii, *PP Kadry*, p. 62. The proportion of *RAP* who were party members in 1931 was 12.0 percent; 1934, 14.2 percent; and 1935, 13.1 percent (*Sots Stroi–1936*, p. 589). In 1939 about 15 percent of all *RAP* were Communist Party members.
[29] See discussion in ch. VI, especially table VI–77.

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number and proportion among *RAP*. One can only speculate that such figures have been given because of the favorable impression they make. That discriminatory practices against Jews exist, however, is borne out by the fact that they have been losing ground even in this area where their representation has traditionally been favorably high. A comparison of figures for 1955, 1958, and 1959 in table V–29 provides evidence of this:

TABLE V–29.—*Proportion of Jews among total number of RAP, 1955, 1958 and 1959*

	1955	1958	1959
Total number of *RAP* (thousands)	223.9	284.0	310.0
Index	100	121	139
Number of Jews (thousands)	24.6	29.0	30.6
Index	100	118	124
Proportion of Jews among all *RAP* (percent)	11.0	10.2	9.8

Source: Appendix table V–B–6; *NarKhoz–1960*, p. 757.

The situation is even more striking when we consider that in 1939 probably about 19 percent of all *RAP* were Jews.[80] In other words, while the number of *RAP* increased more than 300 percent over the last 20 years, the increase in the number of Jews in *RAP* positions was only about 55 percent, and the Jewish representation among total *RAP* was cut in half, from 19 percent in 1939 to 9.8 percent in 1959.

The statistics on the national composition of *RAP* in appendix table V–B–6 also indicate that while the numerical rate of growth of *RAP* for various nationalities was high (particularly for the Central Asiatic nationalities where the rate was several times higher than the growth rate for all *RAP*), except for the six nationalities mentioned in table V–28, none of the nationalities gained a representation equivalent to their share in the entire Soviet population.

The proportion of women among the various categories of *RAP* has not changed significantly since 1947, as shown by table V–29A. For all the years in question the proportion of women was

[80] See appendix table V–B–6. Jews are included in the "other" category of 20,000 (which together accounted for 21.2 percent of the total *RAP* in 1939). Jews constituted the majority of the "other" category.

TABLE V–29A.—*Proportion of women among various categories of RAP, 1947–59*

RAP category	Percent women at year end			
	1947	1950	1955	1959
Total *RAP* categories	35	36	36	36
Doctor or candidate degree holders	29	27	27	29
Professors	5	5	6	7
Associate professors	14	15	17	17
Senior research associates	31	30	30	29
Junior research associates	48	48	52	51

Sources: *KS–1956*, pp. 248, 251; *NarKhoz–1960*, p. 755. The figures in the table are percentages stated in official Soviet sources.

in inverse relationship to the importance of the academic rank, so that while women accounted for about half of all junior research associates, their proportion among full professors never exceeded 7 percent. It is important to note also that in 1959 the proportion of women among all *RAP* had not increased over their share in 1939 (although their absolute number had obviously increased). In January 1939 women represented 36.9 percent of the *RAP* employed in Soviet research establishments and 35 percent of those employed in higher educational establishments.[81]

Table V–30 presents data on Soviet research and academic personnel by sex in 1950 and 1959.[82] While women represented 39 percent of all *RAP* in 1959, among doctor degree holders their share was only 10.7 percent. Women accounted for only 7.3 percent of the full professors, but, even more striking, they accounted for only 3 percent of Soviet academicians (i.e., members of the Academy of Sciences of the U.S.S.R. or the union republic academies of science); out of 766 academicians, only 23 were women. The share of women among the lower categories of *RAP* was much higher—57 percent of junior research personnel, 43 percent of the teachers, researchers, and instructors of lower ranks.

[81] *Kul't Stroi–1940*, p. 239. The proportion of women among *RAP* in the 1930's however, represented a substantial improvement over that in 1929, when it was not higher than 10 percent.

[82] The data here do not compare exactly with those in table V–29 because of different reporting dates and a slightly different arrangement of categories.

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TABLE V–30.—*Research and academic personnel employed in Soviet higher educational establishments and research and development organizations, by academic title, advanced degree and sex, 1950 and 1959*

Academic rank or advanced degree held	January 1950					January 1959				
	Total personnel		Women employed			Total personnel		Women employed		
	Thousands	Percent	Thousands	Percent	Percent of total	Thousands	Percent	Thousands	Percent	Percent of total
Academic ranks:										
Professors	8.9	5.6	.5	.8	5.6	9.6	3.4	.7	.6	7.3
Associate professors (*dotsent*) and senior research workers[a]	33.2	20.4	6.7	11.5	20.2	49.9	17.6	11.2	10.0	22.4
Junior research workers and assistants[a]	19.6	12.0	9.4	16.0	47.9	23.6	8.3	13.5	12.2	57.2
Teachers, researchers, instructors of lower ranks	100.8	62.0	42.4	71.7	42.0	200.9	70.7	85.7	77.2	42.6
Grand total	162.5	100.0	59.0	100.0	36.3	284.0	100.0	111.1	100.0	39.1
Academic degrees held:										
Doctors	8.3	5.1	.6	1.0	7.2	10.3	3.6	1.1	1.0	10.7
Candidates	45.5	28.0	11.4	19.3	25.0	90.0	31.7	27.2	24.5	30.7
Without advanced degree	108.7	66.9	47.0	79.7	44.1	183.7	64.7	82.8	74.5	45.1
Grand total	162.5	100.0	59.0	100.0	36.3	284.0	100.0	111.1	100.0	39.1
Academicians (units)[b]	.....	.....	.....	.....	.....	766	.....	23	.....	3.0

Sources: *Zhenshchina*, p. 56; *NarKhoz—1959*, p. 843; appendix table V–B–2. Number of academicians from text table V–37 and *SSSR-Tsif—1958*, pp. 365–66.

[a] Senior and junior research workers hold academic rank appointments and are not to be confused with rank-and-file employees.

[b] Refers to full-time or corresponding members of the Academy of Sciences of the U.S.S.R., and academies of science of union republics (excluding functional academies).

NOTE.—All percentage figures were computed from actual absolute figures. The figures refer to slightly different reporting dates than those indicated in table V–29. There are also minor differences in grouping, which account for the fact that the computed percentages of women among *RAP* differ slightly from similar percentages reported in table V–29.

Soviet Research Establishments and the Employment of RAP

Contrary to some set notions that the Soviet research organization represents a streamlined administrative pyramid with a well-developed decision-making mechanism, Soviet research in reality has been an unwieldy maze of institutions, sometimes thrown together haphazardly, with different lines of administrative subordination, parochial interests, and widespread duplication. In the last 30 years "institutional research" has mushroomed in the U.S.S.R. along functional lines. When the need arose to design steam turbines, a research institute was formed by the appropriate ministry. The same was true of coal-mining, school construction, welding technology, chemistry, or musicology. Yet broadly speaking, three pyramids came into existence: (1) higher educational establishments, (2) institutes of the academies, and (3) ministerial-departmental research institutes. The growth of research establishments was most extensive in the latter two, with functional institutes formed at the academies and under ministerial-departmental auspices, which until 1957 were in charge of a specific branch of Soviet industry or the economy (now supplanted by state committees or regional economic councils).

The overall dimension of Soviet research establishments outside of higher education at the beginning of 1960 is indicated by the data in table V–31. Chapter VI discusses total employment and professional and semiprofessional manpower in Soviet research establishments by type of institution. We shall deal here with the number and types of research establishments and their employment of *RAP*.

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TABLE V–31.—*Number of and employment in research establishments, 1960*

	Number
Total employment	[a] 1,462,000
Number of professionals employed	[b] 449,000
Number of semiprofessionals employed	[c] 242,000
Number of *RAP* among total employees (mostly professionals)	[d] 164,800
Approximate number of research units of all types	[e] 4,500

Sources: [a] text table VI–70 (and VI–75). About 800,000 were employed in design and development activities, 300,000 of these in project organizations (*Vestnik statistiki*, No. 8, 1960, p. 19).
[b] Appendix table VI–C–5–P (Item D).
[c] Appendix table VI–C–5–SP (Item D).
[d] Appendix table V–B–1.
[e] See discussion concerning this estimate below.

The constellations and interpenetrating hierarchy of Soviet research establishments, design and development offices, administrations and trusts, design and surveying institutes, and so forth, represent a totally unexplored area of study. Altogether there are about 4,500 identifiable "units" engaged in one or another kind of research (including design, development of products or processes and in testing activities). Several hundred of these constitute the chief components of the Soviet "industry of invention." They are run by a complicated web of interlocking jurisdictional hierarchies.

Neither Soviet sources nor Western surveys have dealt comprehensively with this complex area of human activity and organization in the U.S.S.R. Nor are there institutional studies, save for those on the structural aspects of the Academy of Sciences of the U.S.S.R.[83] The present discussion should be looked upon merely as trying to clarify the most essential features of the Soviet research complex and to present a crude outline of the existing institutional arrangement.

It has already been mentioned that Soviet higher educational establishments, both institutes and universities, are involved in research activity of varying scope and significance. It may be a by-product of teaching activity or independent of it; it may be part of the institution's program or contracted from outside. Whatever its nature, such research activity has not been the prime activity of higher educational establishments, but in an effort to increase the amount of research activity in these establishments, administrative measures have been taken in recent years.[84]

On the other hand, the express purpose of a research institute (*nauchno-issledovatel'skii institut*) is mainly to conduct research, although some of them participate in aspirantura training and the award of advanced degrees. Soviet research institutes (abbreviated as *RI*) may engage in purely scientific (basic) research, in applied research, in development and testing activities, and even in research in such diverse fields as medicine, pedagogy, linguistics, the fine arts or economic planning. Research institutes are subordinate to various administrative bodies, such as the academies of sciences, ministries and committees of the Council of Ministers of the U.S.S.R., or regional economic councils.

The matter is further complicated, however, by the fact that there are several gradations of RI's. Most of them are known by abbreviations, the letters standing either for the location, jurisdiction or specialized field of activity of the institution. In such an abbreviation one or several Russian letters may be used, as follows:

1. *Research institutes engaged in fundamental or applied research, development or testing activity*

I.—"institute" (*institut*), mostly a unit affiliated with one of the academies or else a small unit (at times not more than an independent laboratory) under local jurisdiction or the jurisdiction of another larger unit.[85] The RI's of academies may have branches in other localities.

NII (or *NI—nauchno-issledovatel'skii institut*).—this is the prevalent type of RI in a specialized field of activity, subordinated mostly to a division or main administration of a ministry or a regional council of the national economy. Its distinguish-

[83] A. Vucinich, *The Soviet Academy of Sciences*, Hoover Institute Studies, Series E, Institutions, No. 3, Stanford: Stanford University Press, 1956. See also A. Buchholz, *Ideologie und Forschung in der Sowjetischen Naturwissenschaft*, Schriftenreihe Osteuropa, No. 1, Stuttgart, 1953.

[84] Over half of the teaching staffs and about 200,000 higher education students were reportedly engaged in research activity in 1959 (*VVSh*, No. 4, April 1960, pp. 51–56). This was a report by V. M. Bykov, Chairman of the Research-Technical Council of the Ministry of Higher and Secondary Specialized Education. The Council (*Nauchno-Tekhnicheskii Sovet—NTS*), established in 1956, co-ordinates all the research activity in higher educational establishments.

[85] Some of the larger *TsNII* or *VNII* (see below) have several institutes. The ferrous metallurgy *TsNII Cher Met* in 1956 had five "institutes" within its structure (*Promyshlenno-ekonomicheskaia gazeta*, May 4, 1957). Similarly, some large universities (Leningrad, Moscow, Khar'kov) have institutes within their structures.

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ing characteristic is that it is engaged in a highly specialized design and development activity. This research activity deals with product and process design, development, and at times testing, within a given industry or its special subdivision. In addition to these RI, there are "laboratories" or "central laboratories" which operate as research institutes. Usually *NII's* are single-branch establishments.

GNII (or *GNI*).—"national" RI (*gosudarstvennyi naúchno-issledovatel'skii institut*), which is a large unit engaging in several closely related specialized research design and development activities. Often there are several branch offices. Although such RI's are often under regional jurisdiction, their activities may be of national significance.

VNII (or *VNI*).—"all-union" RI (*vsesoiuznyi nauchno-issledovatel'skii institut*), which is a sizeable unit with many branches engaged in several related areas of research, design and development (and at times testing and experimental production) activity. Originally, most of these "all-union" RI's were subordinate to a specific ministry in charge of a given segment of the Soviet economy, but after the recent reorganization of the economic administration (i.e., in May 1957) many institutes were transferred to the jurisdiction of the State Planning Committee (*Gosplan*) or other committees of the Council of Ministers of the U.S.S.R.

ENII (or *ENI*).—experimental research institute (*eksperimental'nyi nauchno-issledovatel'skii institut*), a unit most commonly found in industry which is engaged in making pilot models of products, their design, manufacture and testing. *ENII* may be an independent unit or a subsidiary to *NII, GNII,* or *VNII.*

TsNII (or *TsNI*).—"central" RI (*tsentral'nyi nauchno-issledovatel'skii institut*) is a unit which, in terms of activity, performs about the same functions as *VNII* (in fact many *TsNII* of the 1930's were renamed *VNII* after World War II). *TsNII* have usually only one main office or else a few branches, while *VNII* may have up to 20.

2. *Specialized design, development and testing bureaus for products and processes*

TsKB.—"central" design bureau (*tsentral'noe konstruktorskoe biuro*), a unit engaged in design and development activity under the auspices of one of the ministries, committees or administrations in charge of Soviet industry. Many important industrial research and development outlets are called *TsKB,* instead of some type of RI.

SKB.—"special" design bureau (*spetsial'noe konstruktorskoe biuro*), a unit subordinate to a plant or local economic administration which carries out highly specialized design and development activity.

GosSKB.—"national" special design bureau (*gosudarstvennoe spetsial'noe konstruktorskoe biuro*), a unit run by several plants (or trusts) for the purposes of product design and development or else a unit under central administration, like *TsKB.*

OKB.—special purpose or independent (*osoboe*) or experimental bureau (*opytno-konstruktorskoe biuro*), a design and development and/or testing unit under the auspices of one or several cooperating plants.

KB.—"design bureau" (*konstruktorskoe biuro*), usually a design office within an industrial plant, although at times found within the administration of regional economic councils or under the jurisdiction of several plants.

3. *Project design offices and administrations*

GIPRO.—"national" RI for the design of . . . (*gosudarstvennyi institut po proektirovaniiu . . .*), an institute engaged in surveying, projecting, designing, estimating the construction cost, preparing blueprints, etc. for various construction projects, from bridges and sewerage systems to steel mills. Actually the word *proekt* means project and has a very broad connotation—preparing a design from a survey of the terrain to making blue-prints or making economic assessments concerning plant location, technology, shop layout, etc.

While *GNII* and *VNII* deal with product and process design and development, *GIPRO* deals with the choice of site, plant layout and the design of buildings and all associated facilities for a manufacturing unit or an entire complex.

VNIPI.—There is also a combination of *VNII* and *GIPRO* called *VNIPI* (all-union research—*vsesoiuznyi-nauchno issledovatel'skii i proektnyi institut*) and design institute which operate on a larger scale than *GIPRO.*

Proekt.—In addition to this latter group of RI's, there are offices, bureaus or "trusts" which perform similar functions but which are called "something or other . . . *proekt*" (. . . design bureau). These are usually multi-unit institutions with offices located in major industrial centers and a research center in Moscow. They specialize in a branch of industry or several related types of projects. Originally they were subordinated to ministries, but since 1957 some of them have been placed under the jurisdiction of committees of the Council of Ministers of the U.S.S.R.

All the establishments of the first category are included in the number of Soviet research institutions. However, only some of those in the

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second and third categories are so counted.[86]

In addition to the three basic types of independent research establishments, there are various other units conducting research of one kind or another—museums, libraries, medical laboratories, agricultural experimental stations, astronomical observatories, etc.—all of which are considered part of the Soviet research establishment and are included in the total number of research institutions.

A basic difficulty encountered in trying to set forth quantitative data on Soviet research establishments and related units is that there are frequent consolidations, branching off, regrouping and renaming of the individual RI's or their subdivisions. Statistics therefore cannot be very precise. This limitation notwithstanding, table V–32 presents what data are available on the total number of research establishments for selected years. The official total of research institutes at the beginning of 1960 was 1,608.[87] In addition, there were 1,200 project and design institutes employing 300,000 people.[88] There is undoubtedly some double counting in these figures, but the overall dimension is significant. There were about 2,800 units of the RI type and their branches. All told, the number of research units of all types (including libraries, museums, laboratories, etc.) was about 4,500, engaged in a multitude of specialized tasks and under various jurisdictions. However, in terms of importance, size of staff, and research contributions, probably only some 500 main RI-type establishments were significant.

TABLE V–32.—*Aggregate number of Soviet research establishments, 1914–60*

Year (January)	Total number of research establishments of all types	Of which: research institutes proper, their offices and divisions
1914	.....	289
1931	1,350	643
1934	1,582	1,050
1935	1,494	933
1939	1,557	757
1941	1,821[a]	786
1948	2,645[b]	1,081
1951	2,848[c]	1,157
1956	2,797[d]	1,210
1957	2,756	1,264
1958	2,983	1,340
1959	3,197	1,481
1960	3,548	1,608

[a] Of which 507;
[b] 472;
[c] 571; and
[d] 574 were experimental stations (mainly agricultural).
Sources: *NarKhoz–1932*, p. 546; *Kul't Stroi–1935*, p. 143; *SotsStroi–1936*, p. 589; *Kul't Stroi–1940*, p. 230; *KS–1956*, p. 244; *NarKhoz–1960*, p. 753.

Table V–33 presents data on the number of research establishments for selected years 1931–56, the last year for which such information is available, with a breakdown by type of institution so that we can gain some idea of what Soviet sources mean by "research establishments." The number of institutions in each category of reporting fluctuated considerably, indicative of the consolidation and fragmentation discussed above, a process particularly common in the early 1930's. In the late 1950's there was also an extensive reorganization with some institutions branching off, others consolidated, and scores renamed and placed under different jurisdictions. For example, a library which had been in existence for decades, could suddenly be classified as a "research library"; or an agricultural experimental station, which opened a new test field 20 miles away, would then account for two units. Nevertheless, the only data available for the postwar period (1956) can be compared with the prewar data if these definitional limitations are borne in mind.

Table V–34 summarizes the information on the "main research institutes" of the Soviet Union and their divisions for the years for which data are available. A similar process of branching out and consolidation can be observed here also during the years 1930–55. Whatever effects this process had, however, the number of main research institutes in the education and cultural field, in the health and medical field, in the agricultural field, and probably also in the socioeconomic field, was in 1955 about the same or even smaller than it had been in 1939 or in 1933.

[86] After having processed several hundred primary items dealing with research and development, the author cannot make head nor tail of the Soviet rationale for singling out some *TsKB, SKB, GIPRO,* or *proekt* as "research institutes" and not others.

[87] The processing of primary sources for this study resulted in the actual identification of 1,351 main research institutes and branch offices. Five all-union and 15 union-republic newspapers and 17 specialized periodicals for the period 1956–60 were processed, with the very able assistance of Dr. J. F. Hough.

[88] *Ekonomicheskaia gazeta*, Oct. 26, 1960.

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TABLE V–33.—*Number of research establishments in the U.S.S.R. by type of institution as of January 1 for selected years, 1931–56*

Type of institution	1931[a]	1934	1935	1939	1956
1. Main research institutes	.....	860	804	694	1,064
2. Branch divisions of main research institutes	.....	190	129	[b]63	146
Subtotal, 1 and 2	643	1,050	933	[b]757	1,210
3. Experimental stations (primarily agricultural)	.....	.....	.....	.....	574
4. Experimental fields, test bases and support bases	.....	.....	.....	.....	184
Subtotal, 3 and 4	220	336	341	[b]416	758
5. Independent laboratories	165	None	7	.....	142
6. Observatories	13	21	30	34	38
7. Institutions of nature and wildlife preservation and conservation	21	35	35	61	74
8. Independent commissions, committees, and divisions of academies of science	3	None	.....	.....	60
9. Museums engaged in research	186	82	103	169	392
10. Libraries engaged in research, and archives	39	44	45	36	61
11. All other research establishments:					
a. Unspecified residual	60	14	.....	[c](94)	62
b. Undistributed (4 to 11a)	None	None	None	384	None
Total	1,350	1,582	1,494	1,557	2,797

[a] As of March 1.

[b] Figure in *Kul't Stroi–1940*, p. 230, checks with that in *KS–1956*, p. 244.

[c] Derived as a residual from *KS–1956*, p. 244, which gives 382 "other undistributed" institutions, minus the sum of institutions given in *Kul't Stroi–1940*, p. 230.

Sources: *NarKhoz–1932*, p. 546; *Kul't Stroi–1935*, p. 143; *Sots Stroi–1936*, p. 589; *Kul't Stroi–1940*, p. 230; *KS–1956*, p. 245.

If we compare just 2 years, 1938 and 1955, the entire increase in the number of main research institutes can be explained by the increase in the number of industrial (mainly engineering) research institutes and institutions of the academies of science of the U.S.S.R. and the union republics. In other words, while the total number of main research institutes increased by 370 during the period 1938–55, the main research institutes of the academies and of the industrial research field combined increased by 398 institutions during the period with an accompanying decline in the number of main research institutes in health and in educational-cultural fields, and only a very modest gain of 17 in the agricultural field.

For several years we are able to match the information concerning the number of research establishments by type or field (tables V–33 and V–34 above) with data on the number of *RAP* employed. These latter data are presented in tables V–35 and V–36.

The data in table V–35 indicate that by 1955 about four-fifths of the total number of *RAP* employed in research establishments were employed in "main research institutes" and their divisions, a situation which was true in previous years as well. Put another way, less than two-fifths of the total number of research establishments employed about four-fifths of the total number of research personnel.

The most striking observation to be made on the data in table V–36 is that the only areas where there was a significant increase in the number of *RAP* between 1938 and 1955 were the academies of science and the industrial research establishments. In agriculture, health,[89] education, and presumably in the socioeconomic field the absolute increase in the number of *RAP* during the 17-year period was almost *negligible*. The growth in the number of research and academic personnel during this entire period can in fact be attributed almost wholly to the increment of *RAP* employed in the academies of science and the industrial research establishments.

[89] As of December 1956, Soviet medical establishments employed 28,663 *RAP*, of whom 16,411 were in higher education, 10,169 worked in research institutes, and 2,083 in various medical service laboratories. See M.D. Kovrigina (ed.), *Sorok let sovetskogo zdravookhraneniia* (Forty Years of Soviet Public Health), Moscow, 1957, p. 388. The figure on *RAP* in medical research institutes is about the same as that given for public health in table V–36.

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TABLE V–34.—*Number of "main research institutes," their divisions and research stations in the U.S.S.R., by type, year end, 1930–55*

Type of institution by branch	Main research institutes				Divisions of main research institutes				Research stations			
	1930*	1933	1938	1955	1930	1933	1938	1955	1930	1933	1938	1955
Academies of sciences, total	.....	64	82	309	Reported jointly under main research institutes	2	2	13	.....	.....	.....	52
a. Academy of Sciences of U.S.S.R.	.....	.....	.....	87		.....	.....	6	.....	.....	.....	19
b. Of union republics	.....	.....	.....	222		.....	.....	7	.....	.....	.....	33
Industrial, total	336	170	153	324		61	35	101	.....	.....	.....	32
a. Industry proper	{ 315	{ 145	{ 146	280		{ 54	{ 32	88	.....	.....	.....	27
b. Construction				32				6	.....	.....	.....	3
c. Transportation and communication	21	25	7	12		7	3	7	.....	.....	.....	2
Agricultural, total	360	115	84	101		21	6	21	.....	336	416	466
Health	208	217	253	226		24	15	5	.....	.....	.....	3
Education and culture, total	.....	95	95	63		8	2	None	.....	.....	.....	17
a. Education	59	.....	.....	55		.....	.....	None	.....	.....	.....	17
b. Culture and arts	.....	.....	.....	8		.....	.....	None	.....	.....	.....	None
Other, unspecified	.....	.....	.....	41		.....	.....	6	.....	.....	.....	4
Socioeconomic	104	42	27	.....		2	3	.....	.....	.....	.....	.....
Undistributed residual	498	157	.....	.....		72	.....	.....	.....	.....	.....	.....
Total	*1,565	860	694	1,064		190	63	146	.....	.....	.....	574

* Includes 215 research divisions of higher educational establishments counted in the undistributed residual.
* As of March 1931.
Sources: *NarKhoz–1932*, p. 547; *Kul't Stroi–1935*, p. 143; *Kul't Stroi–1940*, p. 238; *KS–1956*, p. 245. Figures refer to "main research institutes" and their divisions and research stations only.

TABLE V–35.—*Employment of RAP by type of research institutions in the U.S.S.R., year end, 1931-55*

[In thousands]

Type of institution	1931*	1933	1934	1955
1. Main research institutes	.....	.....	.....	73.5
2. Branch divisions of main research institutes	.....	.....	.....	3.8
Subtotal, 1 and 2	22.5	41.3	38.2	77.8
3. Experimental stations (primarily agricultural)	.....	.....	.....	6.2
4. Experimental fields, test bases and support bases	.....	.....	.....	.6
Subtotal, 3 and 4	2.1	4.0	4.4	6.8
5. Independent laboratories	1.7	None	.1	2.6
6. Observatories	.3	.5	.5	.7
7. Institutions of nature and wildlife preservation and conservation	.1	.2	.2	.7
8. Independent commissions, committees and divisions of academies of science	.3	None	.....	2.1
9. Museums engaged in research	1.4	1.5	1.7	3.5
10. Libraries engaged in research, and archives	.9	.6	.8	2.0
11. All other research establishments:				
a. Unspecified residual	.3	.2	.....	2.1
b. Undistributed (4 to 11a)	None	None	.....	None
Total	29.6	48.3	45.9	97.8

* As of March 1.
Sources: *NarKhoz–1932*, p. 546; *Kul't Stroi–1935*, p. 143; *Sots Stroi–1936*, p. 589; *KS–1956*, p. 245.

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TABLE V–36.—*Employment of RAP in the U.S.S.R. in research, institutes, by branch, year end, 1930-55*

[In thousands]

Type of institution by branch	Main research institutes				Divisions of main research institutes				Research stations			
	1930[a]	1933	1938	1955	1930	1933	1938	1955	1930	1933	1938	1955
Academies of sciences, total	(c)	2.2	3.5	18.1	(c)	.02	.1	.6	.....	.....	.....	.5
a. Academy of Sciences of U.S.S.R.	.....	.....	.....	11.0	Reported jointly under main research institutes	.....	.....	.5	.....	.....	.....	.2
b. Of union republics	.....	.....	.....	7.1		.....	.....	.1	.....	.....	.....	.3
Industrial, total	9.8	13.3	12.7	37.5		1.2	.6	2.8	.....	.....	.....	.34
a. Industry proper	{9.1	{12.0	{11.8	32.6		{1.1	{ .5	2.5	.....	.....	.....	.3
b. Construction				2.3				.1	.....	.....	.....	.03
c. Transportation and communication	.7	1.3	.9	2.6		.1	.1	.2	.....	.....	.....	.01
Agricultural, total	5.4	5.7	4.5	4.1		.5	.1	.2	.....	4.0	5.8	5.2
Health	4.3	7.4	9.6	9.8		.3	.4	.1	.....	.....	.....	.03
Education and culture, total	.....	2.3	1.7	2.2		.1	.2	None	.....	.....	.....	.1
a. Education	1.7	.....	.....	1.6		.....	.....	None	.....	.....	.....	.1
b. Culture and arts	.....	.....	.....	.6		.....	.....	None	.....	.....	.....	None
Other, unspecified	.....	.....	.....	[d]1.8		.....	.....	.1	.....	.....	.....	.1
Socioeconomic	2.5	1.7	.8	.....		.03	.1	.....	.....	.....	.....	.....
Undistributed residual	7.1	.(5.6)	.....	.....		[b](1.0)	.....	.....	.....	.....	.....	.....
Total	[e]30.8	[b]38.2	32.8	73.5		[b]3.15	1.5	3.8	.....	.....	.....	6.2

[a] As of March 1, 1931.

[b] Distribution by branch of employment is based on incomplete reporting, with about 90 percent of institutions reporting. The distribution refers to 34.75 thousand in main research institutes (32.6) and their divisions (2.15) combined. The total *RAP* in main research institutes and their divisions was 41.3 thousand. This deficit of about 6.6 thousand was assigned to the undistributed residual (5.6 in main research institutes and 1.0 in their divisions).

[c] Employed in other ministries and departments of the government (unexplained).

[d] Total includes *RAP* in higher educational establishments, which could not be subtracted from the breakdowns. The number in this case was about 1.2 thousand and the total differs by this amount from the grand total in main research institutes and their divisions indicated in table V–35 as 29.6 thousand.

[e] *Kul't Stroi—1940*, p. 240, reports for Jan. 1, 1932 (i.e., a year later than that indicated on the table) that academies employed about 1.2 thousand *RAP* (the Academy of Sciences of the U.S.S.R. employed 1.1 thousand). A figure for 1930 was not found.

Sources: *NarKhoz—1932*, p. 547; *Kul't Stroi—1935*, pp. 143, 148; *Kul't Stroi—1940*, p. 238; *KS—1956*, p. 245.

In the Soviet network of research establishments, the most elaborate and sizeable are the academies of science and the industrial research institutes. Table V–37 provides data on the number of such institutions and the *RAP* employed therein in 1958 and 1960. At the beginning of 1960 academies of all types employed 58,147 *RAP*, or 35 percent of the *RAP* engaged in all types of research establishments (164,800). The remainder worked in research institutions of other types, a large proportion of which were industrial research and development outlets.

In the 1930's and 1940's there was a substantial increase in the proportion of *RAP* employed by the Academy of Sciences of the U.S.S.R. and the academies of science of the union republics. While in 1933 the academies of science employed about 6 percent of all *RAP*, by 1955 their share had increased to almost 25 percent. It remained at about this latter figure in 1960.

Reorganization of the Soviet Research and Development Establishment

In recent years the entire Soviet research establishment has been subject to considerable reorganization, with many shifts in the jurisdictional subordination of individual institutes. This reorganization was undertaken in conjunction with changes in the organization of the economic administration.

Until 1929 all Soviet research and development organizations (except those concerned with military areas) were directly subordinate to the Supreme Council of the National Economy, the highest governmental body in

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TABLE V–37.—*Soviet academies of sciences, research institutes and research and academic personnel employed therein as of January 1958 and January 1960*

Institution	Year founded	Number of academicians: full and corresponding members		Number of research institutes		Number of research and academic personnel	
		1958	1960	1958	1960	1958	1960
Academy of Sciences of the U.S.S.R.	1725	443	503	200	238	17,644	23,150
Republic Academies:.							
Ukrainian SSR[a]	1919	204	208	58	60	2,156	3,274
Belorussian SSR	1928	80	76	21	30	807	1,250
Uzbek SSR	1943	63	60	27	30	1,211	1,838
Kazakh SSR	1945	59	76	37	37	1,261	1,500
Georgian SSR	1941	76	70	37	44	1,356	2,084
Azerbaidzhan SSR	1945	34	39	22	24	987	1,612
Lithuanian SSR	1941	36	35	14	15	410	499
Latvian SSR	1946	33	37	19	20	629	819
Kirgiz SSR	1954	26	26	12	12	440	544
Tadzhik SSR	1951	31	29	15	27	317	709
Armenian SSR	1943	61	59	27	28	709	1,074
Turkmen SSR	1951	30	37	15	21	281	466
Estonian SSR	1946	33	32	17	17	410	498
Subtotal, republic academies	.....	766	784	321	365	10,974	16,167
Academy of Construction and Architecture of the U.S.S.R.	1956	192	196	28	33	1,812	2,642
Academy of Construction and Architecture of Ukrainian SSR	1956	13	31	16	26	698	1,628
Academy of Arts of the U.S.S.R.	1947	81	109	4	4	102	92
Academy of Medical Sciences of the U.S.S.R.	1944	229	216	29	32	2,063	2,678
Academy of Pedagogical Sciences of RSFSR	1944	97	92	13	13	565	577
Academy of Communal Services of RSFSR	1931	.....	.....	4	4	283	359
All-Union Academy of Agricultural Sciences	1929	143	142	164	165	3,952	4,758
Academies of Agricultural Sciences of:							
Ukrainian SSR	1957	22	45	91	76	2,164	1,744
Belorussian SSR	1957	14	28	22	23	665	833
Uzbek SSR	1957	16	15	38	41	843	1,222
Kazakh SSR	1957	20	20	36	51	864	1,142
Georgian SSR	1957	.....	21	.....	11	.....	564
Azerbaidzhan SSR	1958	.....	6	.....	15	.....	591
Subtotal, agricultural academies	.....	215	277	351	382	8,488	10,854
Grand total	.....	2,036	2,208	966	1,097	42,629	58,147

[a] The Moldav branch of the AS U.S.S.R., which had 8 institutes and 272 researchers in 1960, will be organized into a republic academy of sciences in 1961.

Sources: *SSSR-Tsif–1958*, pp. 365–66; *NarKhoz–1960*, p. 759.

charge of industry, agriculture, and other production activities. It coordinated all research activity. In 1929 Pandora's Box was opened, however, when individual research and development institutes were placed under separate departmental auspices in order to intensify their applied work and to identify them more closely with service to individual sectors of industry. In the 1930's the Supreme Council of the National Economy itself was broken up into a variety of administrative departments called "commissariats" (renamed "ministries" in 1945), each of which took charge of a given industry sector. Under their auspices, specialized, functional research and development institutes were established and expanded in number and size.

The Academy of Sciences of the U.S.S.R., since 1933 subordinate to the Council of People's Commissars (later Ministers), was under increased pressure to engage in applied research. In response to this pressure, it set up many specialized engineering and technological institutes. In 1935, in order to handle these applied

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research tasks, a new Division of Engineering Sciences was added to the Academy's other two divisions—of natural sciences and mathematics and of the humanities. The Academy was again reorganized in 1938, when its number of divisions reached eight; and in order to broaden the regional base in scientific research, it was empowered to supervise the regional academies of science set up in different Soviet republics, first as branch offices, then divisions, and, ultimately, quasi-independent union-republic academies of science.

The debate concerning the Soviet science and research setup originated in July 1955. In February 1956, at the 20th Party Congress, Khrushchev declared:

> The separation of research activity of the Academy of Sciences, departmental research institutes and higher educational establishments can no longer be tolerated. This separation and lack of coordination prevent the concentration of research activity on the solution of major scientific and engineering problems, lead to duplication of effort and waste of resources, and retard the introduction of research and engineering achievements into production.[40]

Although similar thoughts had occasionally been expressed by other Soviet leaders, the demand to streamline the organization of Soviet research and development had never before been presented so forcefully. In 1956 and 1957 a veritable flood of proposals by prominent scientists appeared in the Soviet press, all aimed at streamlining the research organization along the lines of consolidating the fragmented, specialized units and breaking down departmental boundaries.

Along these lines, it was proposed in the summer of 1957 that research institutes be grouped in two categories—principal and secondary.[41] The principal or "leading" institutes were to be subordinated to some of the remaining ministries but for the most part to the State Planning Committee (*Gosplan*) and other state committees. The *Gosplan* was to coordinate research and development. The administration of secondary research institutes was to be transferred to the regional economic councils and their activities made "closer" to production. Some research institutes were to be merged with higher educational establishments or industrial laboratories.

The reorganization was begun in 1957, and although some transfers are still going on, the major changeover was undertaken by mid-1958, when 323 research units and 19,000 *RAP* employed in them came under the subordination of the *Gosplan* of the U.S.S.R., state planning committees of the union republics, and regional economic councils.[42] The research establishments subordinated to these administrations were chiefly in the industrial field and dealt with technology and project design and development. The *Gosplan* also set up a new division, the *Glavniiproekt* (Chief Administration of Research and Project Design Institutes), to manage these research establishments.

In order to speed up the introduction of new technology and scientific discoveries into industry, a separate State Committee on Science and Technology was established (called *Gostekhnika* in 1955, and since May 1957, *Nauchno-Tekhnicheskii Komitet*), which was to conduct research on the uses of new technology, disseminate technological information, and supervise the adaptation of foreign technology.

During this reorganization turmoil, the Academy of Sciences of the U.S.S.R. came under particularly heavy fire, not only to intensify its activities on applied problems for industry but also to direct and coordinate applied research in the other research pyramids. There were three external pressures upon the Academy:

Political. The communist leadership insisted upon an efficient and economical way of conducting research and development activities, a reduction of departmental barriers and unnecessary duplication, and especially a speeding up of the application of research results (particularly engineering technology) to industry. It wanted the Academy's work geared toward these objectives and made "closer to production."

Industrial. The managers of Soviet industry, who were sometimes passive or even reluctant to use new technology for fear of disrupting production activity, wanted the Academy's researchers not only to make general scientific investigations and to engage in design and development of products and processes but also to engage in model produc-

[40] *Pravda*, Feb. 15, 1956.
[41] *Pravda*, Aug. 31, 1957.
[42] *Promyshlenno-ekonomicheskaia gazeta* (Industrial-economic Gazette), June 15, 1958. The *Gosplan* itself had jurisdiction over 16,000 these *RAP*. See also I. A. Evenko, *Voprosy planirovaniia v SSSR na sovremennom etape* (Problems of Planning in the U.S.S.R. in the Present Stage), Moscow, 1959, p. 32.

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tion and testing and, thereafter, participate in getting the "bugs out."

Educational. For the last three decades, although great lip service has been paid to the research activities of Soviet universities and other higher education institutions, their main preoccupation has been with academic tasks largely separated from applied research. Some highly theoretical work was indeed carried out at universities, but they had only limited access to experimental research facilities. Their applied (contractual) research for industry was small in terms of funds and facilities, although academic personnel frequently participated in the research effort through multiple-job holding in facilities outside higher education. The educational reforms introduced in 1958 demanded the expansion of research work in higher education institutions proper, and universities and institutes turned their attention toward the possibility of merging with or absorbing some of the separate research institutes. In order to strengthen applied instruction and increase research activity, demands were made to transfer a number of research institutes of the academies to higher education auspices.

These three external pressures, however, were counteracted by one fundamental internal force. The scientists engaged in fundamental and theoretical research, and the leadership in numerous research institutions of the Academy not directly concerned with applied activity, desired greater emphasis on basic research. They urged the separation of activities and the setting up of new research institutes not along specialized, functional lines, but as research task forces or problem areas with an interdisciplinary orientation. In effect, the working theoretical scientists and the leadership of the Academy wanted to rid it of activities which were not genuinely scientific. Largely in compliance with this objective and indeed in full recognition of the problem, A. N. Nesmeianov, then the Academy's President, suggested in 1958 that Soviet science "can no longer rely upon foreign basic science. . . . What we need now first of all is to develop the fundamental sciences. . . . We need to take decisive measures for the speediest and most widespread development of basic science."[43] He then proposed a sharp reorganization of scientific inquiry, with the Academy dealing only in basic research; other applied research in technical and engineering fields was to be carried on by industrial institutes. The radical nature of Nesmeianov's proposals, i.e., the separation of basic and applied research activities, struck a blow at a cardinal assumption of Soviet dogma, that the "unity of theory and practice" is fundamental to dialectical materialism and that the separation of applied and theoretical objectives in research is inadmissible.

In the summer of 1959 Khrushchev recognized that a "difficult situation exists in some institutions of the Academy,"[44] and suggested that some technical institutes be removed from its jurisdiction since the work of the Academy had become too big and complex to continue to have so many technological research functions. The Academy was to continue with experimental research in biology, geology, and some other areas of the natural sciences, but not in such applied areas of technology as mining, coal, metallurgy, transportation, and other kinds of industrial research.

In keeping with Khrushchev's proposals, Academician N. N. Semenov suggested that the Engineering Sciences Division of the Academy be abolished altogether and its other divisions be consolidated into three major groups: experimental, geological, and social sciences.[45] Research in engineering and the humanities should be carried on elsewhere. Such an arrangement would break down the narrow disciplinary lines of former Academy divisions and institutes. In the newly organized institutes, the departmental assignment of specialized fields to separate research institutes would thus be abolished. In the ensuing debate, Semenov's proposals were supported by many leading scientists but were opposed by the applied-technology hierarchy within the Academy's Engineering Sciences Division, who wanted the Academy to retain applied technological tasks so as to have a link with industry and production. Despite the opposition, Semenov continued to contend that the "responsibility to the state for developing science should rest with the Academy, and for its technical application with the appropriate research institutes elsewhere."[46] The same note was again struck in 1960 by other theoretical scientists, and Nesmeianov declared anew his belief that the Academy "should engage in basic research primarily."[47]

On April 10, 1961, the Central Committee of

[43] *Uchitel'skaia gazeta*, May 20, 1958.

[44] *Pravda*, July 2, 1959.
[45] *Izvestia*, Aug. 9, 1959.
[46] *Ibid.*, Dec. 16, 1959.
[47] *Pravda*, Dec. 31, 1960.

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the Communist Party and the Council of Ministers of the U.S.S.R. issued a decree, "Concerning Measures To Improve the Coordination of Research and Development Work in the Country and the Activities of the Academy of Sciences of the U.S.S.R." [48] It pointed up the problem:

> The presence at the Academy of Sciences of the U.S.S.R. of a large number of specialized research institutions diverts its attention from the long-run basic problems of science, splinters its work force and material resources on many technical problems of a departmental nature, which can be handled successfully in specialized research and development institutes. These shortcomings in the work of the Academy and in other research and development organizations are largely a result of the absence in the country of a single governmental unit which could coordinate research on a national scale. The absence of such a unit in many cases has led to unjustifiable duplications in research and the irrational use of scientific personnel and material resources.

The new governmental decree resolved the issue in part at least. It declared: "Institutes of applied specialized profiles, upon the recommendation of the Academy's Presidium, will be transferred to other state committees, ministries and departments." [49] If all the Academy's institutes with a technological profile were thus affected, it would mean a transfer of up to 50 research institutes with an estimated 8,000 *RAP*. Furthermore, the regional branch offices of the Academy of Sciences of the U.S.S.R. are to be transferred to the jurisdiction of the Council of Ministers of the Russian SFSR and to be operated by regional economic councils.

In fact, such a decision was already adopted at the plenary session of the Presidium of the Academy on April 10.[50] Accordingly, exclusive of the Academy's affiliates (branch offices),[51] the transfers have so far affected about 30 research institutes, employing between 2,000 and 3,000 *RAP*. Affected were not only the industrial research institutes of the Academy's Engineering Sciences Division,[52] but also institutes under other divisions of the Academy,[53] the latter also engaged primarily in applied technical research. Despite these proposed cuts, the Academy will remain the U.S.S.R.'s largest research unit (as of January 1961 it had 23,000 *RAP*, among them 1,362 doctor and 7,618 candidate degree holders).

The decree stipulated further that "the work of the Academy should be focussed primarily on the most important long-run problems of science undergoing rapid development." These were precisely the functions which the Academy's leadership had been asking for. The Academy will continue to: (1) exercise scientific and methodological leadership and conduct research in the area of the natural sciences (physics, mathematics, biology, and sciences of "the universe and earth," i.e., geology, oceanography, astronomy, etc.) and also in the humanities (languages, literature, linguistics, history, ethnography, etc.); (2) aid the academies of science of the union republics in their research; (3) coordinate the activities of all the Academy's institutions; (4) maintain scientific ties with foreign countries; and (5) engage in the training of research personnel.

The Academy's role in regard to function (1) above was clarified further to include the coordination of work in those areas conducted not only at the Academy but by other institutes as well, especially higher educational establishments.[54] Although the decree does not make it clear, according to Academy Vice-President Topchiev, the Academy's role in function (4) above will be to coordinate scientific exchanges with foreign countries, and particularly to expand its activities in the exchange and dissemination of scientific information.

In accordance with the decree of April 10, a new State Committee on the Coordination of Research and Development was established.

[48] *Ibid.*, April 12, 1961.
[49] *Idem.*
[50] This information was given to the author by Professor A. V. Topchiev, vice-president of the Academy of Sciences of the U.S.S.R., in Washington, D. C., on April 26 and 27, 1961. Dr. Topchiev attended the plenary session just before his trip to the United States. He indicated that no public announcement of this decision had as yet been made, since the Presidium was still considering the possibility of additional transfers of research institutes.
[51] There are seven branches: Bashkir, Dagestan, Karelian, Kazan', Kola, Komi and Ural. An eighth branch—Moldav—is currently being reorganized into a union-republic academy. The seven branches are being transferred to the jurisdiction of the Council of Ministers of the RSFSR
[52] For example, the Institutes of Complex Transportation Problems, Metallurgy, and Hydraulic Engineering and Water Economy. In addition, the Institute of Mining is to be transferred from the Academy (*Vestnik Akademii Nauk*, No. 4, 1961, pp. 3–6).
[53] For example, in the Geography-Geology Division—Institutes of Geological Prospecting, of Coal Geology; in the Chemical Division—Institutes of Silicate Chemistry, of Forestry and Wood Chemistry; in the Biological Division—Institute of Soil Sciences.
[54] *Ekonomicheskaia gazeta*, Apr. 20, 1961.

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This committee will supervise the work of research and development establishments in fulfilling the most important scientific research and engineering problems in accordance with the directives of the Party and the Soviet Government. It will coordinate the work of the Academy of Sciences of the U.S.S.R., the academies of science of the union republics, ministries and departments in fulfilling the most important research work of an interdepartmental or interdisciplinary nature, and also provide guidance for research and development work up to the point of its adaptation in the national economy.

On the recommendation of the Council of Ministers of the U.S.S.R., the councils of ministers of the union republics, and ministries and departments, the State Committee on the Coordination of Research and Development, together with the State Planning Committee, will develop plans for research and development work in the country at large and for the introduction of scientific and engineering accomplishments in production. The task of the new committee will be to propose these plans for approval by the Council of Ministers of the U.S.S.R.

The Committee on Coordination will deal specifically with:

(1) national control over the fulfillment by all ministries, departments and organizations of the most important research work; and on an operational basis, oversee the most rapid introduction of scientific and engineering accomplishments into production;

(2) preparation of proposals for the most important research and development work of national significance, and concern with problems posed by new discoveries and inventions;

(3) preparation of proposals concerning the supplying of research and development organizations with unique equipment, installations and instruments;

(4) study and evaluation of scientific and engineering accomplishments (both domestic and foreign) with a view toward their possible introduction into the national economy;

(5) coordination of all interdepartmental activities of ministries, departments and research and development organizations in the area of science and technology;

(6) preparation of annual and long-run plans for financing, material-technical supply of research and development work, including plans of capital investment for the development of science.

(7) It will also handle the certification of major research and development institutes, and such new institutes may be opened only with its consent. Particular attention of the committee will be devoted to designating "major" institutes (*golovnyi instituty*), which are interdisciplinary or "problem" research centers. They have been set up under different departmental auspices in recent years, and it is anticipated that a number of additional such centers will be established in the near future.

The former State Committee on Science and Technology has been absorbed by the new State Committee on Coordination. The All-Union Institute of Scientific and Technical Information, which was originally subordinate to this State Committee (though operated jointly with the U.S.S.R. Academy of Sciences), has now been transferred to the new State Committee on Coordination. As in the past, the Institute of Scientific and Technical Information will be the central translating, abstracting and disseminating organ for domestic and foreign scientific information.

Except for this scientific information institute, the new State Committee on the Coordination of Research and Development will not operate any research institutes directly; rather, its function will be to guide the research activities of an interdisciplinary nature of great importance in research units under the jurisdiction of other state committees or departments. However, as in the past, specialized research and development work not of national significance and not of an interdepartmental or interdisciplinary nature will be coordinated by ministries, departments, and regional economic councils.

Closely associated with the reorganization moves was the sudden replacement of the Academy's President, A. N. Nesmeianov, by Academician M. V. Keldysh, who was elected to that post at an extraordinary general meeting of the Academy on May 19, 1961.[55] The official version of the meeting was that former President Nesmeianov had petitioned to be relieved of his duties because of the "expiration" of his second 5-year term in office. Technically, however, his second term would not expire until October 1961, for he was elected by the general assembly of the Academy on October 13, 1956. Furthermore, the extraordinary plenary session of the Academy was called together on May 19 by its Presidium (governing board) to "ratify" the resignation of Nesmeianov, which had already

[55] *Pravda*, May 20, 1961.

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been "accepted," and to elect a new president whose candidacy was already endorsed by the Academy's Presidium, the "Communist Party group" of the Academy, and by the Academy's divisions. Each of these moves indicates clearly that the new president was co-opted prior to formal election.

The new president, a professor and doctor of mathematical sciences, M. V. Keldysh, has had a meteoric rise in the largely conservative body of the Academy. Elected as a corresponding member in 1943, he became a full member in 1946 (the span between the two ranks is usually at least 10 years). In 1953 he was elected a member of the Academy's ruling body—the Presidium—and became its vice-president in February 1960. One further attribute of his career is that he did not at any time belong to the internal managerial hierarchy of the Academy; all of his research work in mathematics, aerodynamics, aircraft and rocket technology was done outside the Academy's research institutes. He thus belonged to that group of academicians (about half of the total 161 full and 369 corresponding members) who are in the Academy of Sciences of the U.S.S.R. as honorific members, rather than staff scientists in one of its many research institutions. Dr. Keldysh has a long-standing working relationship with the members of the new Committee on Coordination active in the Soviet military research and development effort. His appointment to the presidency was undoubtedly influenced by the fact that in addition to his scientific competence, he has had wide organizational experience with the large-scale research and development effort outside the Academy. It is this research-management experience which is needed in the institutional reorganization and streamlining of the Academy's research functions presently being undertaken.

The April 10 decree established for the first time in Soviet history a central coordinating agency for research and development for the country at large, which is to be headed by a Deputy Chairman of the Council of Ministers of the U.S.S.R. It is to be composed of the president of the Academy of Sciences of the U.S.S.R., the Minister of Higher and Secondary Specialized Education, the Chairman of the State Committee on Automation and Machine Building, the Chairman of the State Committee on Chemistry, the Chairman of the Committee on Inventions and Discoveries, one of the deputy chairmen of the State Economic Council, and one of the deputy chairmen of the State Planning Committee.

There will also be "other members" of the Committee on the Coordination of Research and Development from other state committees dealing with research and development work. They were not identified by position in the official decree, but the heads of other governmental departments dealing with research and development will definitely be represented. These are chairmen of the following agencies: State Committees on Aviation Engineering, Armaments Engineering, Radio-electronics and Electronics, Shipbuilding, Atomic Energy, and also the head of the Ministry of Medium Machine Building (atomic and other weapons development and production). All these committees are of tremendous importance. Their work is that of the "unmentionables," those "who work in secret," whose "names remain unknown to the world," "who created our atomic and rocket technology."[56] Some of this very outstanding research was undoubtedly carried on in the research centers of the administrative pyramids mentioned above, but some of it was probably conducted in other research outlets with deliberately ordinary names and a large part in the research outlets under the jurisdiction of the military.

The State Committee on the Coordination of Research and Development will form a permanent scientific council consisting of leading specialists and scientists of the country with advisory functions and, when the occasion arises, will call for special boards to study specific problems. Particular significance should be assigned to this latter function. Soviet sources indicate that "although about 80 permanent scientific councils are in existence today . . . about one-half of these are inactive."[57] The new State Committee on Coordination will thus streamline and activate the work of scientific councils in diverse areas of research, whose activities will now be coordinated by a permanent scientific council. Through these measures, it is hoped,

[56] Khrushchev's speech at Bitterfeld, East Germany, as reported in *Pravda*, July 22, 1958.
[57] *Ekonomicheskaia gazeta*, April 20, 1961.

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the "leadership role of scientists now working within the Academy of Sciences of the U.S.S.R. will intensify in the work of the nation's research organization." [58]

The new measures to coordinate research and development are obviously designed to give even more emphasis to the physical sciences and engineering and complex interdisciplinary problems. The important consideration is that the new Chairman of the State Committee on Coordination is a person with a strong military research and development background. In addition, most of the heads of the state committees with research and development functions have similar backgrounds. This is also the case with the newly elected president of the Academy, who has not only general military research and development background, but specifically rocket and space technology development experience. All the committee heads are former engineers active in defense fields now turned industrial managers and political leaders. Upon examining their background, it is hard to resist the conjecture that their past interests will have profound implications for the future of Soviet research efforts in applied fields: technological in nature, though strong in military application.

Whatever the case, however, the intended result of the establishment of the State Committee on Coordination is the synchronization of the Soviet research and development effort in the distinct institutional pyramids—academies, higher education, and departmental research institutes. What is even more significant, perhaps, is that the responsibility for scientific research and development decisions has now been elevated to the highest pinnacle of the Soviet power hierarchy—for the first time in Soviet history a deputy to the Prime Minister (K. N. Rudnev) has been charged with the supervision of these tasks.

In regard to other areas of research, it appears that the earlier set-up will continue, as follows:

(1) Research on economics will be coordinated by the State Economic Research Council of the Council of Ministers, which was set up in 1959, with the chief role assigned to the economic research outlets of the *Gosplan* and with ever-increasing use of mathematical methods of centralized planning and production programming.

(2) As in the past, the Academy of Medical Sciences will supervise and conduct medical research, sponsored largely by the Ministry of Public Health.

(3) The Ministry of Agriculture, with its All-Union Academy of Agricultural Sciences and five other regional agricultural academies set up since 1957, will coordinate agricultural research and manage experimental agricultural stations. In the case of both medicine and biology, the Academy of Sciences of the U.S.S.R. will not be involved save for basic research in biology.

(4) The State Committee on Construction, with its own Academy of Architecture and Construction (organized in 1956), will coordinate construction and architectural research.

(5) Political studies (especially "philosophy") will be guided largely by the Academy of Social Sciences of the Central Committee of the Communist Party.

(6) In the field of education, the Academy of Pedagogical Sciences of the Russian SFSR will remain the national clearing house and conduct major research.

The new centralization of the decision-making mechanism in Soviet research and development will no doubt be manifested in the near future. Freed from burdensome technological tasks, the Academy of Sciences will be able to concentrate more effort on basic research. Many of its institutes are expected to be reorganized. The Soviet authorities hope that the new measures will (1) improve the system of both long-run and current planning of research and the coordination of research and development activity, (2) further strengthen theoretical research on the most important scientific problems within the Academy, (3) allow for closer ties between departmental research institutes and industry, and (4) allow more rapid introduction of research and development results into production technology and the economy.

The separation of functions must be clearly recognized. On the operational level, the Academy will delegate some of its former functions in applied industrial research to other agencies, and within the Academy, institutes will be reorganized in such a way as to cope with complex interdisciplinary and basic research problems, including a very likely increase in the Academy's role in space exploration. On the consulting and decision-making level, the prestige and resources of the Academy will, as in the past, be utilized, though now there will be an intermediate link—the Committee on Coordination

[58] *Pravda*, April 21, 1961.

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—which will in turn exert pressure upon the Academy.

Perhaps these measures are a recognition of a turning point in Soviet technological development—the point of diminishing returns from the adaptations of Western technology has now been reached and new and vigorous domestic technological development becomes a necessity. The Soviet political leadership appears to be convinced that the invigoration of technological research activities can be more profitably achieved by separating functions and by freeing the Academy of Sciences of the U.S.S.R. to concentrate its attention on basic research and the long-run problems of science. Reorganization of the Soviet research setup could provide an effective mechanism for channeling scientific manpower and material resources into strategic areas of the physical sciences and engineering and other complex areas of interdisciplinary research towards the achievement of the most ambitious long-run goal of Soviet power—world leadership in science and technology.

In our attempt to assess the effort expended by the Soviet Union in training and utilizing its scientists and scholars, we have discussed many factors bearing on the magnitude of that effort. We have also inevitably left many questions unanswered. Probably the most that can be said is this: Soviet science and research may be likened to an iceberg. There is more to it than meets the eye. Those from afar, who passingly admire it, view it as an enormous, solid chip of an eternal glacier which, though broken away from its source, floats peacefully on a charted course. Those who come closer and scratch its surface are often overwhelmed by the purity of some of its crystals, yet appalled by the layers of decayed ice covering them. They are dismayed by the crevices which run deep through its face. In either case, both sightseers and explorers of Soviet science can only guess at what lies below the surface—how big, how deep, and how strong the inner core is, the core which holds the iceberg's cap together. We can be absolutely certain, however, that the size of the iceberg—of the Soviet research and development effort—is very large indeed, and is primarily oriented toward the physical sciences and engineering.

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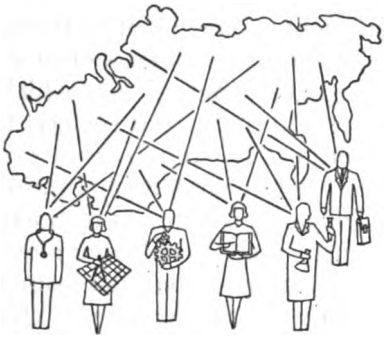

CHAPTER VI

Employment of Professional and Specialized Manpower in the U.S.S.R.

Specialized personnel in the Soviet Union are grouped into three distinct categories: professionals with higher education; semiprofessionals with specialized secondary education; and practicals, i.e., persons who are employed as specialists but have not received formal specialized training.

The majority of Soviet specialists are counted in the category of workers and employees.[1] Earlier discussion of professionals and semiprofessionals has shown that their training is aimed ideally at preparing them for a definite professional occupation which they are expected to assume upon graduation. This chapter will deal primarily with the total stock of Soviet specialized manpower and its allocation in the various branches of the national economy of the U.S.S.R. Important problems of utilization of trained manpower will be explored in relationship to formal fields of training and to total employment.

In this connection, we must clarify the terminology first. By "utilization" reference is made to the *locus* of employment in the U.S.S.R. rather than to types of activity, as is customary in United States usage. American literature on the utilization of specialized manpower emphasizes that it is not the total stock of trained professional manpower or its employment in various groups of institutional units, but rather its proper utilization—whatever the jobs might be—that counts in advancing certain technological, production, research and development goals. The American term "utilization" mostly defines *activity* on a given job, comparing what the ideal job specifications or actual work tasks performed by an individual are in their relation to his training, field of specialization, professional qualifications, etc.

By contrast, the Soviet literature on "utilization" focuses attention on how many specialists are employed in a given industry, a sector of the economy, or a group of research establishments. More specifically, it is the place of employment rather than the type of activity which is stressed in Soviet sources in connection with the term "utilization of specialists" (*ispol'zovanie spetsialistov*). Furthermore, to define activity, Soviet sources generally single out the level of employment (top management, administrative and supervisory jobs or production) of specialists in a given unit or groups of units. Only as a very rare exception do we find bits of official information on what Soviet specialists actually do in their positions in terms of allocation of effort (to paper work, decision-making, research or performance of technical functions in engineering, agriculture, medicine, etc.). We have practically no knowledge of the complementarity of the jobs of a superior and his deputies, of the division of tasks or delegation of functions. There is little choice, therefore, but to analyze the patterns of employment in the U.S.S.R. in the terms in which they are usually discussed

[1] *Rabochie i sluzhashchie,* variously translated in English sources as "wage earners and salaried employees," "wage and salary workers," "workers and employees," etc. In this study the terms "workers and salaried employees" or, simply, "workers and employees" will be used.

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in Soviet sources.

The two approaches address themselves to different problems. The American approach to the question of utilization in terms of activity provides answers as to how efficiently the existing jobs are matched with the existing stock of specialized manpower. It largely overlooks, however, the problem of the deployment of the stock of specialized manpower by industry sector. The Soviet approach, on the other hand, deals largely with the latter aspect and overlooks, for the most part, the first aspect. The consideration of utilization in terms of job activity may indicate the efficient use or waste of specialized manpower resources in a given setting, but it tells us little about alternative uses of the total stock. The consideration of utilization in terms of place of employment, on the other hand, tells us about alternative uses of specialized manpower, but does not indicate what specialists do on the job. Ideally, in order to make a comprehensive assessment of the efficiency of utilization of specialized manpower, both types of information are required. In practice, Western researchers must rely upon the available data which have been compiled by the various agencies of the Soviet Government.

It may be recalled that the prevailing policy of directed placement of specialists forces the majority of graduates of Soviet semiprofessional secondary schools and higher educational establishments to embark immediately upon graduation on jobs which largely coincide with the field of their formal training. This placement policy restricts the individual's mobility from one occupational field to another; it fosters geographic mobility to some extent by the involuntary dispersion of trained personnel; but it has only a slight effect upon the vertical mobility of trained specialists.

The first effect is of particular interest for this study. It suggests that once an individual has received specialized formal training, the institutional device of involuntary placement compels him to enter and usually to remain within the field of his formal training. By exploring the patterns of employment of Soviet specialists, we can approach meaningfully the question of what actually happens to the graduates after they have been placed in a given occupational category. The patterns of employment and utilization of specialized manpower are a reflection, in addition to placement policy, of such diverse factors as career expectation, earnings, personal motivation, job prestige, benefits, etc., which in the U.S.S.R., as in any industrial society, force the individual either to retain the occupation originally attained through formal training or to seek, partly through the means of horizontal or vertical mobility, more suitable employment opportunities that may or may not coincide with the formal fields of training. In this chapter the extent to which all these propositions are applicable in the U.S.S.R. will be explored further.

Another aspect of the discussion that follows will be a comparison of the information on employment and the census enumeration of specialists with available data about the past training of specialists in various fields. These comparisons will yield information on factors such as total losses, attrition rates, retention in gainful employment, etc. Finally, on the basis of these data it will be possible to examine the relationship of trained manpower to the Soviet population, labor force, and workers and employees, and to point out the differences and similarities in the employment patterns of trained professional manpower in the two most industrially advanced nations of the world—the U.S.S.R. and the United States.

In order to arrive at some meaningful answers, a number of lengthy statistical procedures have been employed. Most of the technical details, estimates, and various checks, as well as a discussion of the sources, are given in appendix VI; the text that follows is primarily an analysis of the statistical data presented there.

Soviet Population and Levels of Educational Attainment in the U.S.S.R. and the United States

Table VI–1 summarizes basic information on the level of educational attainment of the Soviet population as reported by the Soviet census of January 1959.

Since the Soviet official population census figures presented in table VI–1 give no reference as to age group, further interpretation of these data is essential. It may be assumed from the nature of the statistics given (i.e., 7-year education as a minimum) that the data apply to the

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TABLE VI–1.—*Level of educational attainment of the Soviet population as of Jan. 15, 1959*

[In thousands]

Level of educational attainment	Male	Female	Total	Urban	Rural
Incomplete secondary general education (7-year and partial 10-year)	17,070	18,316	35,386	20,254	15,132
Complete secondary general education (10-year)	4,408	5,528	9,936	7,426	2,510
Complete secondary semiprofessional education or equivalent	3,413	4,456	7,870	5,446	2,424
Incomplete higher education	820	918	1,738	1,332	406
Total with partial secondary, complete secondary or partial higher education	25,712	29,218	54,930	34,458	20,472
Complete higher education	1,933	1,845	3,778	3,170	608

Sources: *Pravda*, Feb. 4, 1960; *NarKhoz–1960*, p. 21.

population age 15 and over. Completion of 7-year education normally takes place at age 14. Under such an assumption, figures for persons with less than 7-year education have been compiled in table VI–2.

TABLE VI–2.—*Estimated number of persons with less than 7 years of education in the Soviet population aged 15 and over as of 1959*

[In thousands]

	Male	Female	Total
Total population aged 15 and over	63,232	84,954	148,186
With 7 or more years of education	27,645	31,063	58,708
Residual with less than 7-year education	35,587	53,891	89,478

Sources: Appendix table II–A–5; text table VI–1.

Furthermore, the 1959 Soviet census report disclosed that among those who had less than 7-year education, 12.5 million had partial junior secondary (5 to 7-year) education. Thus, in 1959 there were about 77 million persons in the U.S.S.R. who had 4 or less years of education.

Table VI–3 presents data on the level of educational attainment in the United States as of March 1959.

The new Soviet census data are very revealing once they are arranged in the proper manner and subjected to analysis and comparison with similar information for the United States. By using Soviet and American data, a comparison

TABLE VI–3.—*Level of educational attainment of the United States population aged 14 and over as of March 1959*

[In thousands]

Level of educational attainment	Male	Female	Total
Population aged 14 and over	59,258	63,561	122,819
School completion:			
4 years and under, none and unspecified	5,627	4,641	10,268
5 to 7 years	7,365	7,121	14,486
8 years completed	9,992	10,115	20,107
1 to 3 years of high school	12,834	14,275	27,109
Total with 8 years or partial secondary education	22,826	24,390	47,216
Completed 4-year high school or equivalent	13,418	19,024	32,442
Partial higher education (1 to 3 years of college)	4,938	5,146	10,084
Total partial secondary, complete secondary and partial higher education	41,182	48,560	89,742
Complete higher education (4-year colleges)	2,983	2,494	5,477
5 or more years of higher education	2,101	745	2,846
Total with completed higher education	5,084	3,239	8,323

Source: U.S. Department of Commerce, Bureau of the Census, *Current Population Reports, Population Characteristics*, Series P–20, No. 99, Feb. 4, 1960, p. 13.

of the level of educational attainment in the two countries has been made in table VI–4.

In 1959 over one-half of the Soviet adult population had had less than 4 years of schooling. In the United States in the same year more than half of the adult population had had up to 11 years of schooling. The estimated median number of years of schooling completed in the Soviet

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TABLE VI–4.—*Comparison of educational attainment levels in the U.S.S.R. and the United States, 1959*

Soviet Union (January 1959)			United States (March 1959)		
	Thousands	Percent	Percent	Thousands	
Population aged 15 and older	148,186	100.0	100.0	122,819	Population aged 14 and older
Educational attainment:					Educational attainment:
None, elementary, 4 years or less, and unspecified	76,978	51.7	{ 3.5 4.9	{ 4,217 6,051	None and unspecified. 1 to 4 years of school.
5 to partial 7	12,500	8.4	11.8	14,486	5 to 7 years.
Completed 7 to partial 10	35,386	23.9	38.5	47,216	8 to 11 years.
Completed 10-year education	9,936				
Completed semiprofessional or equivalent	7,870				
Subtotal, completed secondary education	17,806	12.0	26.4	32,442	Completed secondary (12 yrs.).
Partial higher education	1,738	1.5	8.1	10,084	Partial higher education (1-3 years of college).
Completed higher education	3,778	2.5	6.8	8,323	Completed higher education (4 or more years of college).

Sources: Text tables VI–1, VI–2, and VI–3.

Union was about 3.8, compared with 10.9 in the United States. In 1959 the Soviet Union had only two-thirds as many persons with partial and completed secondary education as had the United States, and only 45 percent as many with completed higher education.

In terms of the median number of years of schooling completed, the U.S.S.R. achieved in 1959 what the United States achieved at the turn of the century. In terms of the number of persons with partial or completed secondary education, the Soviet Union in 1959 stood where the United States stood in 1930. And in terms of the population of higher education graduates, the Soviet Union in 1959 was in a position reached by the United States in 1940.

This 1- to 3-generation lag of the U.S.S.R. behind the United States in terms of the level of educational attainment does not deny the Soviet Union's rapid progress in the course of the last few decades; indeed, the *rates* of growth of the educated component of the population in the U.S.S.R. are considerably higher than in the United States. Nevertheless, the level of edu-

TABLE VI–5.—*Comparison of U.S.S.R.-United States levels of educational attainment, in relation to population, total and by sex, 1959*

	Soviet Union			United States		
	Total	Male	Female	Total	Male	Female
Population (millions)	208.8	90.0	114.8	175.4	86.7	89.7
Persons with partial or completed secondary education (millions)	53.2	24.9	28.3	79.7	36.3	43.4
Per 1,000 population	255	277	246	455	420	484
Persons with partial higher education (1 to 3 yrs.) (millions)	1.7	0.8	0.9	10.1	4.9	5.2
Per 1,000 population	8	9	7	58	57	58
Persons with completed higher education (4 or more years) (millions)	3.7	1.9	1.8	8.3	5.1	3.2
Per 1,000 population	18	21	16	47	59	36

Sources: Text tables VI–1 and VI–3; appendix table II–A–5.

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cational attainment of the Soviet population remains significantly lower compared to the United States (and if per-capita ratios are compared in the two countries, the U.S.S.R. is at even greater disadvantage because of its larger population base). Furthermore, the comparisons just made reflect the Soviet educational policy over the last three decades—the top of the educational pyramid, i.e., higher education, grew much faster than the base, primary and secondary schooling.

In conclusion, data on the level of educational attainment in the two countries per 1,000 population in 1959 are presented in table VI–5.

In comparing the level of educational attainment for the U.S.S.R. as a whole with that of the United States, the indicated per-capita rates demonstrate clearly that the United States is substantially ahead of the U.S.S.R. on all levels, and significantly ahead with respect to the education of women.

Trend in the Level of Educational Attain-.ment of the Soviet Population, 1939 and 1959

The 1939 census of the Soviet population took account of two levels of educational attainment —secondary education and completed higher education. In the last two decades many Soviet sources have stated that "secondary education" referred to completion of the 10-year school, semiprofessional school or their equivalents. As late as 1957 the deputy director of the Central Statistical Administration said that "in the 1939 census only the completion of secondary education or higher educational establishments" was registered in the census reports.[2] As revealed by the 1959 census data in table VI–1, however, coverage was extended to include persons with partially completed secondary education (grades 7 through partial 10). In numerous Soviet stories during 1959 and 1960 the 1939 and 1959 sets of data were compared, thus giving rise to wonder as to the real meaning of "secondary education" in the 1939 census. According to V. Starovskii, currently head of the Central Statistical Agency, in 1939 persons who completed 7-year school or seven or more grades of general secondary school or semiprofessional school, or those who had partial higher education were all classified as having had "secondary education."[3] A similar interpretation is given recently in another Soviet source,[4] the conclusion being that the 1939 census data on persons with "secondary education" now appear to be comparable to the combined categories of partial and completed secondary school or equivalent as indicated in table VI–1. During the 20-year period 1939-59 the per-capita rates of persons with completed and partial secondary education increased from 77 to 262 persons per 1,000 population. In regard to higher education, in 1928, before its massive expansion began, there were only 1.6 persons per 1,000 population with completed higher education. By 1939 this figure had increased to 6.2, and then tripled to 18.1 by 1959. By comparison, the United States had in 1959 57.6 persons with higher education per 1,000 population.

The data in table VI–6 indicate the exceptionally high rate at which women were added to the Soviet population of higher education graduates, a rate twice as high as that for males in the last 20 years. Searching for an explanation, we may recall that during this period graduates in social service fields (education and health) constituted a large component of the

TABLE VI–6.—*Number and rates of growth of Soviet population of higher education graduates, by sex, 1939 and 1959*

	1939	1959	Rate of growth, 1959 to 1939 (in percent)
Males.....	799,000	1,933,000	242
Females.....	378,000	1,845,000	488
Total..	1,177,000	3,778,000	321

Source: *Pravda*, Feb. 4, 1960; *NarKhoz–1960*, p. 22.

[2] P. K. Pod'iachikh, "O proekte programmy predstoiashchei v ianvare 1959 goda vsesoiuznoi perepisi naseleniia" (Concerning the Projected Program of the Forthcoming Census of Population in January 1959), *Materialy k vsesoiuznomu soveshchaniu statistikov* (Materials for the All-Union Conference of Statisticians), Moscow, 1957, p. 14.

[3] *Pravda*, Jan. 13, 1939. The author is indebted to Mr. M. K. Roof of the Library of Congress for calling his attention to this article.

[4] *Vestnik statistiki*, No. 4, 1960, pp. 49–50.

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total, and within these fields women graduates made up the dominant share.

The 1959 census of the Soviet population has so far not revealed data on educational attainment by age group. The 1939 distribution of Soviet higher education graduates by age is presented in table VI–7. It is likely that the majority of Soviet higher education graduates in recent years completed their training at the age of 22 or 23, and hence it is probable that the 1959 population of Soviet higher education graduates is composed chiefly of persons aged 25–45, with graduates in the 25–35 age group the most numerous. As the data in table VI–7 show, well over one-half of Soviet higher education graduates in 1939 were under the age of 40. It is not likely that this tendency was reversed by the end of the 1950's. (See data on age of graduates employed in the national economy, table VI–18.)

TABLE VI–7.—*U.S.S.R. population of persons 15 years of age and older and number of higher education graduates as of January 1939*

Age and sex	Total population (thousands)	Higher education graduates (thousands)	Percent of total
Total aged 15 and over	109,162	1,094	1.1
Male	50,746	739	1.5
Female	58,312	355	.6
Aged 15-29	46,101	297	.6
Aged 30-39	25,521	466	1.8
Aged 40-49	15,333	211	1.4
Aged 50 and over	22,107	120	.5

Source: *Vestnik statistiki*, No. 6, 1956, p. 90; Lorimer, *The Population of the Soviet Union*, p. 102.
The data refer to pre-1939 U.S.S.R. boundaries. Within U.S.S.R. postwar boundaries the total number of higher education graduates in 1940 was 1,177,000.

The relative youth of the Soviet population of higher education graduates has important implications for the future. Many visitors to the U.S.S.R. have remarked that positions of political leadership, managerial posts and responsible positions in academic and research fields are occupied by persons older than 55. There appears to be a dearth of professional trained personnel, particularly among males, in the age bracket between 40 or 45 and 55, while there is an abundance of professionals in the younger (pre-40 or 45) age groups. This may be one of the chief reasons for the campaign, intensified especially since 1957, to make leadership appointments from among the younger age groups. At any rate, it appears certain that some discontinuity exists in the supply of Soviet higher education graduates in the middle-age bracket.

The 1959 census of Soviet population also reveals the urban-rural breakdown in level of educational attainment, which is summarized in table VI–8.

TABLE VI–8.—*Rural-Urban differences in the level of educational attainment of the Soviet population, 1959*

[In thousands]

	Total	Urban	Rural	Percent rural of total
Total population	208,826	99,782	109,044	52.3
Partial secondary education (gr. 7–10)	35,386	20,254	15,132	42.8
Complete secondary general education (gr. 10)	9,936	7,426	2,510	26.0
Complete secondary semiprofessional (technicums)	7,870	5,446	2,424	30.8
Partial higher education	1,738	1,332	406	23.4
Completed higher education	3,778	3,170	608	16.1

Sources: *Pravda*, Feb. 4, 1960; *NarKhoz–1959*, p. 10; *NarKhoz–1960*, p. 21.

The statistics in table VI–8 show that the educational attainment of the Soviet rural population leaves much to be desired. Among the total population of Soviet higher education graduates, only 16 percent were from rural areas (i.e., mostly teachers, agronomists and medical doctors). Thus only 5.6 persons per 1,000 rural population were higher education graduates, compared with 32 for Soviet cities. The neglect of rural education is further seen in the fact that while the number of persons with partial and completed secondary education was 162 per 1,000 population in the cities, it was 4 times lower than this, or 37 per 1,000 population, in rural areas. These concrete statistics demonstrate how pronounced the rural-urban differences in

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the educational level of the Soviet population are.

Table VI–9 presents information on the level of educational attainment in the U.S.S.R. by union republic. The data reveal substantial inter-regional differences. Five out of 15 republics (particularly the Georgian SSR) enjoyed a substantial advantage over the national average in 1959. The remaining 10 republics showed a much lower level of educational attainment than the national average. The lag is particularly noticeable in the Central Asiatic republics.

TABLE VI–9.—*Level of educational attainment of the Soviet population by union republic, 1939 and 1959*

Union republics	With completed higher education per 1,000 population		With partial and completed secondary education per 1,000 population	
	1939	1959	1939	1959
U.S.S.R. total	6	18	77	263
Russian SFSR	*7	*19	76	263
Ukrainian SSR	*7	17	*90	*286
Belorussian SSR	4	12	67	225
Uzbek SSR	3	13	39	234
Kazakh SSR	5	12	60	239
Georgian SSR	*11	*38	*113	*315
Azerbaidzhan SSR	*7	*21	73	261
Lithuanian SSR	2	13	64	175
Moldavian SSR	3	10	40	186
Latvian SSR	*7	*21	*140	*344
Kirgiz SSR	2	13	32	227
Tadzhik SSR	2	10	27	214
Armenian SSR	6	*28	*81	*289
Turkmen SSR	3	13	46	256
Estonian SSR	*8	*21	*129	*304

* Above national average.
Source: *Pravda*, Feb. 4, 1960.

The interregional differences in the level of education are even more pronounced in the case of women. Table VI–10 compares total educational attainment ratios for women with the total for the population.

It is evident that in their level of educational attainment relative to men, women suffer particularly in the Central Asiatic republics. Thus while the Soviet Union has made very real progress in providing educational opportunity for its people, the pronounced differences in the level of educational attainment between rural versus urban and culturally advanced versus backward regions continue to exist.

TABLE VI–10.—*Level of educational attainment of the Soviet population by union republic and sex, 1959*

Union republics	With completed higher education		With partial and completed secondary education	
	Total, per 1,000 population	Women, per 1,000 women	Total, per 1,000 population	Women, per 1,000 women
U.S.S.R. total	18	16	263	255
Russian SFSR	*19	*18	263	*260
Ukrainian SSR	17	15	*286	*268
Belorussian SSR	12	11	225	217
Uzbek SSR	13	10	234	207
Kazakh SSR	12	10	239	219
Georgian SSR	*38	*33	*315	*315
Azerbaidzhan SSR	*21	16	261	231
Lithuanian SSR	13	11	175	178
Modavian SSR	10	9	186	170
Latvian SSR	*21	*20	*344	*344
Kirgiz SSR	13	11	227	204
Tadzhik SSR	10	8	214	186
Armenian SSR	*28	*24	*289	*280
Turkmen SSR	13	10	256	237
Estonian SSR	*21	*19	*304	*312

* Higher than national average.
Sources: *Pravda*, Feb. 4, 1960; *Narodnoe obrazovanie*, No. 3, 1960, p. 12.

Total Number of Graduates and the Employment of Soviet Higher Education Graduates in the National Economy of the U.S.S.R.

The preceding section has dealt with the total stock of educated manpower in the U.S.S.R. and considered the total population with a given level of education. As in any society, not all higher education graduates in the U.S.S.R. are employed in the civilian labor force; some are retired, others are in the armed forces, some have withdrawn for further study, and so forth. The purpose of this section is to explore the relationship between the total stock of Soviet higher education graduates in the population and those gainfully employed in the national economy of the U.S.S.R. as workers and employees, and to compare the trends with the American situation.

Appendix table VI–A–1 summarizes Soviet official data on the number of professional and semiprofessional graduates employed in the civilian labor force of Soviet workers and em-

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ployees for various years. The definition of this employment category in regard to professionals and semiprofessionals in the Soviet economy must be clarified. When the employment of specialists is reported in the category of "workers and salaried employees," it includes all professionals and semiprofessionals employed in *agriculture* as well.[5] Furthermore, it includes professionals and semiprofessionals in "social organizations," i.e., the trade union and party apparatus. In other words, as far as the reporting of specialists is concerned, the majority are counted as "salaried employees" provided that they are not in the military establishment, permanently or temporarily withdrawn from employment, or are included in a negligibly small category of so-called independent professions (artists, writers, some architects, the clergy). (One can speculate as to where professionals and semiprofessionals who are inmates of concentration camps are reported, but it seems unlikely that they are included in the category of civilian labor force of workers and employees.)

The quantitative estimates of Soviet higher education graduates already developed in an earlier study on the basis of graduation trends[6] do not differ markedly from the statistics which have now been released officially. The procedures employed there in estimating the number of professionals with completed higher education as well as semiprofessionals have been repeated in this study, and the estimates brought up to date.[7] The official releases not only did not invalidate but rather strengthened the earlier finding, namely, that by employing the estimating techniques developed (i.e., use of stock of graduates in a given year, addition of current flows, and deflation by certain rates of attrition), the Soviet official reporting of stocks of Soviet higher education graduates can be verified as perfectly consistent with the graduation trends obtained from the data released annually.

The data on the total stock of Soviet higher education graduates employed in the national economy of the U.S.S.R., summarized in table VI–11, show that in 1959 there were 13 times as many employed professional graduates in the U.S.S.R. as there had been in 1928, with males registering an 8.5-fold increase and females a 25-fold increase. As a result, in 1959, of all professionals employed in the national economy of the U.S.S.R., women comprised 53 percent of the total, or almost double their respective proportion—27.8 percent—in 1928.

It is evident, then, that the growth of Soviet professional manpower during the last 30 years has been achieved in great measure through the widespread integration of women into profes-

[5] Note that most agricultural *labor*—collective farmers—is not reported in this category, but all specialists employed on collective farms, such as agronomists, veterinarians, medical doctors, etc., are counted under the category of workers and salaried employees.

[6] See *SPM*, pp. 220–33 and appendices to ch. VI. At the time this book was prepared, no official reports on graduates employed in the national economy were available.

[7] See appendix tables VI–A–2–P, VI–A–2–SP, the notes to these tables, and appendix tables VI–A–3 and the VI–B series of appendix tables.

TABLE VI–11.—*Number of Soviet professional graduates with completed higher education employed in the national economy of the U.S.S.R., total and by sex, for selected years*

[In thousands]

	1913	1928	Jan. 1941	Dec. 1957	Jan. 1959	Jan. 1960	Jan. 1961	Projection Jan. 1966
Male	.....	168	596	1,341	1,417	.....	.....	2,150
Female	.....	65	312	1,464	1,610	.....	.....	2,350
Total	136[a]	233	908	2,805	3,027	3,236[b]	3,506	4,500
Percent of females in total	.....	27.8	34.4	52.2	53.0	.....	.....	52.3

[a] The accuracy of this official Soviet figure is highly questionable. According to the 1907 census of population, there were 117,000 persons with university education in Russia. The 1914 estimate is 200,000 to 220,000 persons with university education within Russian Empire boundaries (Beilin, *Kadry*, p. 61).

[b] This official figure is slightly below the estimate derived in appendix table VI–B–4–P (3,290,000).

Sources and notes: Appendix tables VI–A–1, VI–A–2–P, VI–B–4–P; *NarKhoz–1959*, pp. 673, 690; *NarKhoz–1960*, p. 602; *Zhenshchina*, pp. 57–58; *SSSR–Tsif–1960*, p. 299. The 1959 composition of graduates by sex is derived from the 1957 base and the distribution of 1958 graduates by sex. The 1965 projection by sex is derived on the assumption of 50 percent female graduates during this period.

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sional occupations. Undoubtedly the loss of male professionals during the Second World War and the substantial withdrawals of males from civilian employment to serve in the Soviet military establishment contributed to this trend. But the fact remains that women with professional education now constitute over half the Soviet professional labor force. During the current Seven-Year Plan (1959–65) Soviet professional manpower is expected to increase by about 50 percent. If it is assumed that this addition of about 1,500,000 higher education graduates will consist of half men and half women, it would follow that in 1965 the proportion of females employed in the national economy of the U.S.S.R. would be about the same as in the late 1950's.

In tables VI–12 and VI–13 below, data on the stock of Soviet higher education graduates in the total population are matched with figures on the employment of professionals in the civilian labor force, i.e., gainfully employed in the national economy of the U.S.S.R.

The two tables reflect a remarkably low and relatively stable rate of employment of male graduates in the civilian labor force of workers and employees, and a significantly high and rising rate of employment of female graduates (1939—78 percent; 1959—87 percent). In 1959 there were 516,000 male graduates with completed higher education who were *not* in the civilian labor force. These 516,000 men were presumably either in retirement, permanently or temporarily, or in the military establishment of the U.S.S.R. If we assume that 92 percent of the total stock of Soviet male graduates [8] are part of the *active* labor force (i.e., civilian plus military employment), then in 1959 some 1,780,000 male higher education graduates were so involved.[9] The military component of this total is accordingly estimated to have stood at

TABLE VI–12.—*Total number and active employment participation of higher education graduates in the civilian labor force of workers and employees in the Soviet Union as of January 1939*

		Male	Female	Total
Total population of living higher education graduates (in thousands)	a	799	378	1,177
	b	(739)	(355)	(1,094)
Higher education graduates in active employment in civilian labor force of workers and employees (in thousands)	a	596	312	908
	b	(526)	(276)	(802)
Proportion of higher education graduates in active employment in the civilian labor force (in percent)	a	74.7	82.6	76.5
	b	(71.3)	(77.9)	(73.5)
Number of higher education graduates *not* in civilian employment (in thousands)	a	203	66	269
	b	(213)	(79)	(292)

a—Population of higher education graduates of the U.S.S.R. in 1939 adjusted to 1940 within postwar U.S.S.R. boundaries and employment as of Jan. 1, 1941.

b—Population of higher education graduates of the U.S.S.R. in 1939 actually within pre-1939 boundaries reported by the January 1939 census of population and estimated employment of professionals as of January 1939.

Sources and notes: Text tables VI–6 and VI–11 above; appendix table VI–A–1; *Pravda*, Feb. 4, 1960; *Vestnik statistiki*, No. 6, 1956, p. 90.

TABLE VI–13.—*Total number and active employment participation of higher education graduates in the civilian labor force of workers and employees in the Soviet Union as of January 1959*

	Male	Female	Total
Total population of living higher education graduates (in thousands)	1,933	1,845	3,778
Higher education graduates in active employment in civilian labor force of workers and employees (in thousands)	1,417	1,610	3,027
Proportion of higher education graduates in active employment in the civilian labor force (in percent)	73.3	87.3	80.1
Number of higher education graduates *not* in civilian employment (in thousands)	516	235	751

Sources and notes: Soviet Census Report, *Pravda*, Feb. 4, 1960. Preliminary release in *Pravda*, Jan. 15, 1960, which gave slightly smaller totals for number of professional graduates. *NarKhoz—1959*, p. 673; text tables VI–6 and VI–11 above, and appendix table VI–A–1.

[8] Various assumptions can be made in this connection. One is that the rate of active participation for male graduates is the same as for Soviet female graduates (i.e., 87.3 percent), which is probably on the minimal side for males. Another is that active participation of male graduates in the U.S.S.R. is the same as, for example, the rate of employment of male graduates in the United States (i.e., 92 percent—see tables VI–14 and VI–15 below). Although this figure was used in the present text, it is probably still on the low side. It is quite possible that the Soviet rate of active participation of male graduates is as high as 95 percent.

[9] The figure could be as high as 1,835,000. See footnote above.

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363,000 persons.[10] Even though this is necessarily a crude estimate, a figure in the neighborhood of 350,000 seems acceptable, and it is clear that the military establishment of the U.S.S.R. utilizes approximately *one-tenth* of the total number of Soviet higher education graduates. It is also to be noted that about four-fifths of the total stock of Soviet higher education graduates are active in civilian employment.

[10] Under alternative assumptions, it could have ranged from 263,000 to 418,000.

TABLE VI–14.—*Total number and active employment of college graduates (4 or more years completed) in the civilian labor force of the United States as of April 1940*

	Male	Female	Total
Total population of living college graduates (in thousands)	1,914	1,431	3,345
College graduates active in civilian labor force (employed and unemployed) (in thousands)	1,768	749	2,517
Proportion of college graduates in active civilian labor force (in percent)	92.3	52.2	75.2
Number of college graduates *not* in active civilian labor force (in thousands)	146	682	828

Source: U.S. Department of Commerce, Bureau of the Census, *Population: Education, Educational Attainment by Economic Characteristics and Marital Status* (1940 Census), Washington, D.C., 1947, pp. 75–82.

TABLE VI–15.—*Total number and active employment of college graduates (4 or more years completed) in the civilian labor force of the United States as of March 1957*

	Male	Female	Total
Total population of living college graduates (in thousands)	4,468	3,055	7,523
College graduates active in civilian labor force (employed and unemployed) (in thousands)	4,124	1,690	5,814
Proportion of college graduates in active civilian labor force (in percent)	92.4	56.1	77.2
Number of college grauates *not* in active civilian labor force (in thousands)	344	1,365	1,709

Source: U.S. Department of Commerce, Bureau of the Census, *Current Population Reports: Labor Force*, Series P–50, No. 78, Nov. 1957, p. 8.

Some comparable figures for the United States are given in tables VI–14 and VI–15.

The high rate of withdrawal of women college graduates from active participation in the labor force in the United States is in striking contrast to the Soviet situation. Thus while the *total* stock of college graduates in the Soviet Union in 1959 was similar to the size of the United States graduate population in 1940, the numbers of actively employed female graduates in the Soviet Union and in the United States were comparable in 1959 and 1957 respectively.

The disparity in the rates of employment of male/female higher education graduates in the Soviet Union and in the United States is clearly reflected in the following data (in percent):

	Male	*Female*	*Total*
U.S.S.R.: Proportion of higher education graduates in active employment in the civilian labor force (1959)	73.3	87.3	80.1
U.S.: Proportion of college graduates in active civilian labor force (1957)	92.4	56.1	77.2

The drain on professional manpower resources in the Soviet Union is stronger on the male component, probably because of their heavy involvement in the military establishment. In the United States, on the other hand, the rate of attrition is stronger among the female population of college graduates, with social reasons clearly in the background. A comparison of the total stock and gainful employment of higher education graduates in the two countries is made in chart XXXII.

The existence of such a divergent pattern of employment between the two countries should be taken into account whenever Soviet educational and employment policies are considered. The retention of women professionals in the labor force in the Soviet Union, from the economic point of view at least, is indeed a marked achievement. However limited child care and preschool facilities may be, they are concentrated in urban areas where most women specialists are employed, and thus they contribute to the retention of females in employment. The new Soviet program of boarding schools, ex-

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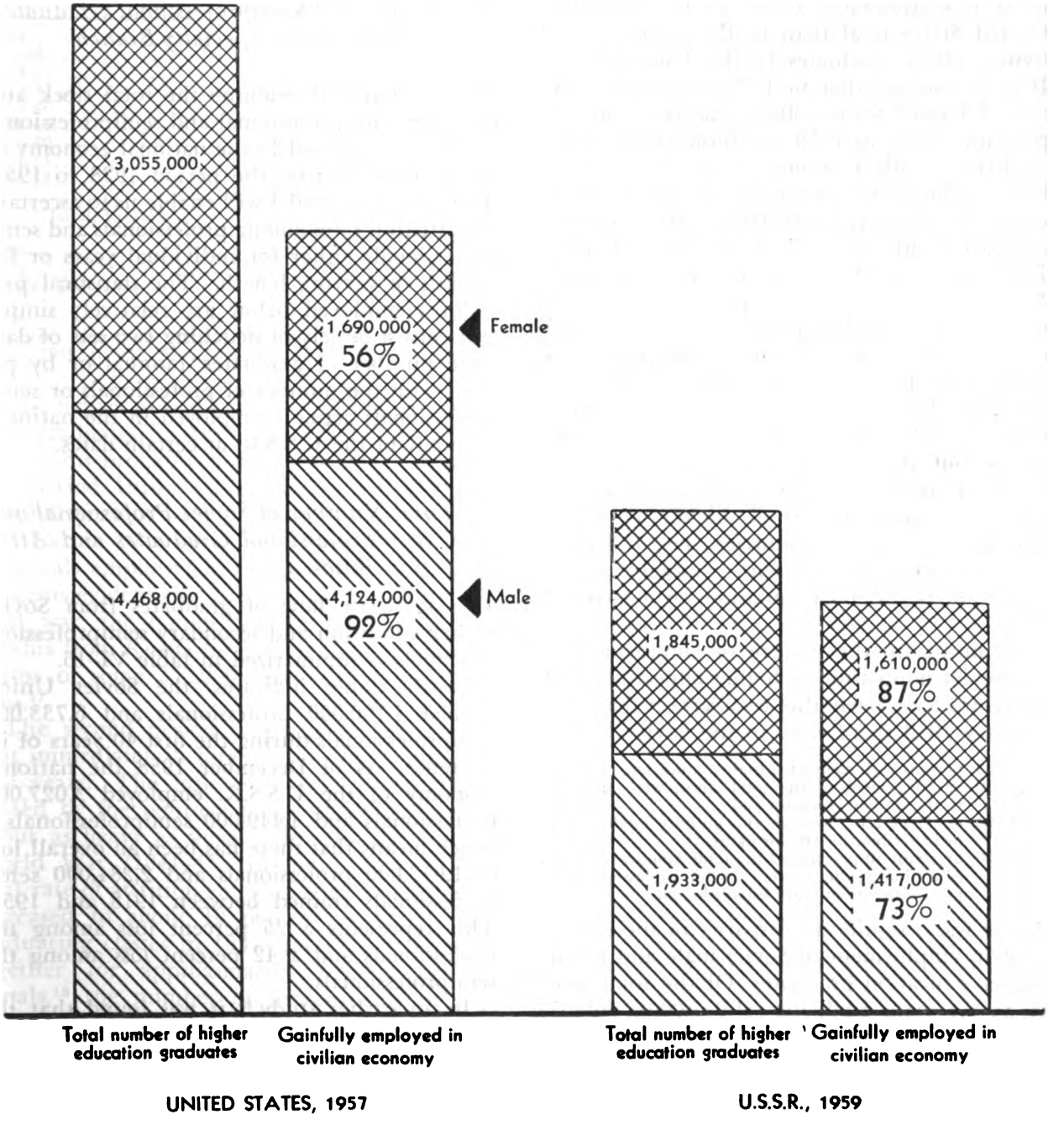
CHART XXXII.—TOTAL POPULATION OF AND GAINFUL EMPLOYMENT BY SEX OF HIGHER EDUCATION GRADUATES IN THE U.S. AND THE U.S.S.R.



Source: Text tables VI–13 and VI–15.

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tended day schools, etc. is undoubtedly designed to keep these retention rates at a high level.

The divergent pattern of employment of professional graduates in the two countries is reflected in the fact that the number of gainfully employed Soviet higher education graduates is considerably closer to the respective United States total than to the population of living college graduates in the United States. If it is assumed that in 1959 the employment rate of United States college graduates was 72.6 percent,[11] then in 1959 the number of college graduates (with 4 or more years of completed higher education) employed in the American economy numbered 6,050,000 (March 1959), compared with the total of 3,027,000 (January 1959), or about half as many, in the U.S.S.R. In relationship to the total population in 1959, the gainfully employed higher education graduates accounted for 14.5 per 1,000 population in the U.S.S.R. and 34.6 per 1,000 population in the United States. The difference is still more than two (2.3) to one in favor of the United States, but the gap in per-capita gainful employment is substantially smaller than for the total per-capita supply of higher education graduates in the two countries (i.e., U.S.S.R.—18.1; U.S.—47.6 percent with completed higher education per 1,000 population, or a factor of 2.7).

Summing up the pattern of employment of the Soviet population of higher education graduates, we have been able to ascertain that as of January 1959 there were in the Soviet Union:

3,778,000 persons with completed higher education, of whom:
3,027,000, or 80 percent of the total stock, were employed in the civilian economy, and
751,000, or 20 percent, were in the military establishment or in retirement. Of this figure
363,000, or about 10 percent, of the total number of higher education graduates were (male) professionals employed in the military establishment.

There was a significant disparity in the rates of civilian employment of Soviet male and female higher education graduates. Of the total stock of Soviet male graduates (1,917,000), only 73 percent were employed in the civilian economy, while of the total of female professional graduates (1,841,000), 87 percent were so employed.

[11] Unpublished estimates by R. Cain, National Science Foundation, dated March 1960, indicate a 4.6 percentage drop in the gainful employment of college graduates in a 2-year period. These gainful employment rates are based on sample surveys, and to what extent they coincide with the true proportion of gainful employment of college graduates will not be known until the 1960 population census data become available.

Stock, Flow and Attrition Rates of Soviet Professional and Semiprofessional Graduates, Total and by Specialty Branch

This section will examine the total stock and flow of Soviet professional and semiprofessional graduates employed in the national economy of the U.S.S.R. during the period 1928 to 1959. The stock-flow model will enable us to ascertain the attrition rates among professionals and semiprofessionals either for individual years or for periods of varying length. The statistical procedures employed below are relatively simple and consist largely of matching two sets of data —the number of graduates (annual or by period) with the number of professionals or semiprofessionals actually employed in the national economy of the U.S.S.R. at certain dates.

1. *Total Number of Soviet Professional and Semiprofessional Graduates and Attrition Rates*

The aggregate flow of graduates from Soviet higher education and secondary semiprofessional schools is summarized in table VI–16.

As the table indicates, the Soviet Union trained 4,100,000 professionals and 6,733,000 semiprofessionals during the first 40 years of its existence. As of December 1958 the national economy of the U.S.S.R. employed 3,027,000 professionals and 4,449,000 semiprofessionals,[12] which means that there has been an overall loss of 1,073,000 professionals and 2,284,000 semiprofessionals trained between 1918 and 1958. This represents a 25 percent loss among the professionals and a 42 percent loss among the semiprofessionals.

In an earlier study[13] it was found that the annual attrition rates for Soviet professionals during the period 1928–55 ranged anywhere from 2 to 4 percent. Two particular periods must be singled out. One dates from the Revolution to 10 years thereafter. Although official

[12] Appendix table VI–A–1.
[13] *SPM*, pp. 231–32, 354–61.

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TABLE VI–16.—*Professional and semiprofessional graduates in all fields in the U.S.S.R., 1914, 1918–60, and 1959–65 projection*

[In thousands]

Years and periods	Professional higher education graduates of universities and institutes		Semiprofessional graduates of technicums and other secondary specialized educational establishments	
	Total	Per year	Total	Per year
1914	.....	12.2	.....	7.4
1918-28	340	30.9	198	18.0
1929-32	170	42.5	291	72.8
1933-37	370	74.0	623	124.6
1938-40	328	109.3	678	226.3
1941-45	302	60.4	540	108.0
1946-50	652	130.4	1,278	255.7
1951-55	1,121	224.3	1,560	311.9
1956-58	817	273.3	1,565	521.8
Total, 1918-58	4,100	.....	6,733	.....
1959	.....	338.0	.....	528.0
1960	.....	342.0	.....	483.0
1959-65 Projection	2,300	329.0	3,200	457.0

Source: Appendix tables III–A–1–G; IV–A–1–G; *NarKhoz–1959*, p. 937; *NarKhoz–1960*, p. 747; Kotov, *Voprosy*, p. 133; *SSSR-Tsif–1960*, pp. 309, 312.

Soviet figures give the number of higher education graduates for 1913 as 136,000,[14] the actual figure was probably closer to 200,000.[15] During the period 1914–28 approximately 380,000 to 400,000 persons were graduated from universities. Yet in 1928 there were only 233,000 professionals employed in the national economy.[16] It seems evident that the revolutionary turmoil, civil war, the famines of the 1920's and the exodus from Russia for political reasons caused a loss of some 350,000 university-trained persons.[17]

The second period of particular interest is that immediately before World War II and the war years. The losses of Soviet professionals caused by the political purge of 1937–38 were about as heavy as those caused by the Second World War (1941–45). In these years the annual rate of attrition among Soviet professionals increased to about 10 percent. Although the graduating classes in 1937 and 1938 accounted together for approximately 200,000 professionals,[18] the number of professionals in the national economy did not change appreciably. Thus the toll of professionals from political purges alone was in the neighborhood of this figure. During World War II another 200,000 to 250,000 professionals were probably lost.

The attrition rates during the immediate postwar years cannot be reliably ascertained because of some transfer at that time of professional manpower from the Soviet armed forces into civilian employment. The annual rates of attrition of Soviet professionals and semiprofessionals for the period 1954–58 were estimated on the basis of the data in appendix table VI–B–1. They are summarized in table VI–17.

TABLE VI–17.—*Annual attrition rates among Soviet professionals anl semiprofessionals in all fields, 1954–58*[a]

Year	Professionals	Semiprofessionals
1954	2.9	0.5
1955	4.1	4.2
1956	positive 1.4	3.8
1957	3.6	3.1
1958	2.5	2.9
5-year mean	2.3	2.7

[a] The annual attrition rate is estimated as the year-end stock of graduates plus graduations during the year, minus the year-end stock the next year in percent of the preceding year-end stock.

Source: Appendix table VI–B–1.

[14] *NarKhoz–1960*, p. 602, and other Soviet statistical handbooks limit their reporting of specialists in the pre-Revolutionary period to those gainfully employed in the "national economy," thus excluding most self-employed professionals.

[15] Beilin, *Kadry*, p. 61.

[16] Appendix table II–A–1.

[17] 1914 stock–200,000; 1914–28 flow of graduates–380,000; 1928 stock–233,000; 1914–28 attrition–347,000.

[18] Appendix table IV–A–1–G.

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The positive rate of attrition in 1956 probably reflects the transfer of personnel from the military establishment into civilian employment.[19] It is indeed likely that as a result of such transfers the attrition rates have been reduced in recent years (to a 5-year mean during 1954–58 of 2.3 for professionals and 2.7 for semiprofessionals). According to one Soviet professional manpower planning specialist, the aggregate attrition rate for professionals in all fields during the period 1950–56 was 3.7 percent per annum.[20] This figure is consistent with the historical (30-year) trend of mean annual losses.

[19] According to Khrushchev, the standing military forces of the U.S.S.R. numbered 5,763,000 in 1955 and 3,623,000 in 1959 (*Pravda*, Jan. 15, 1960).

2. *Retention Rates of Professionals and Semiprofessionals in Employment by Period of Graduation*

Tables VI–18 and VI–19 present data on the number of graduates by period and the number of professionals and semiprofessionals employed in the national economy as of December 1959.

The number of graduates trained during a given period who were found still gainfully employed in the national economy as of 1959 is affected by two factors. One is mortality; the other, withdrawals, either permanent (retirement) or temporary (military service, continu-

[20] K. G. Nozhko, "Nekotorye voprosy planirovaniia podgotovki spetsialistov" (Certain Problems of the Planning of the Training of Specialists), *VVSh*, No. 4, Apr. 1957, p. 18.

TABLE VI–18.—*Total number of Soviet professional graduates, number and proportion employed in the national economy by year of graduation*

Years of graduation	Total number of graduates (thousands)	Graduates employed in the national economy as of December 1959		Distribution of graduates employed, in percent of total	Assumed age of graduates as of December 1959
		Thousands	Percent		
Prior to 1940.....	[a]1,208.0 [b](1,101.0)	645.4 (645.4)	53.4 (58.3)	19.9	42 and older
1941–50.....	854.0	751.5	87.9	23.2	32–41
1951–55.....	1,121.0	869.6	77.6	26.9	27–31
1956–57.....	526.0	455.7	86.6	14.1	25–26
1958.....	291.0	251.6	86.4	7.8	24
1959.....	338.0	261.9	77.4	8.1	23
Grand total.....	[a]4,338.0	3,235.7	74.5	100.0	.....

[a] Includes graduations 1918–40.
[b] Figure based on total number of graduates employed in 1928 plus graduations 1929–40.
[c] Graduations 1918–59.
Source: *NarKhoz–1960*, pp. 618, 747.

TABLE VI–19.—*Total number of Soviet semiprofessional graduates, number and proportion employed in the national economy by year of graduation*

Years of graduation	Total number of graduates (thousands)	Graduates employed in the national economy as of December 1959		Distribution of graduates employed, in percent of total	Assumed age of graduates as of December 1959
		Thousands	Percent		
Prior to 1940.....	[a]1,790.0 [b](1,880.0)	878.8 (878.8)	49.1 (46.5)	18.4	37 and older
1941–50.....	1,818.0	1,145.2	62.9	23.9	27–36
1951–55.....	1,560.0	1,152.7	73.8	24.1	22–26
1956–57.....	1,014.0	802.8	79.2	16.8	20–21
1958.....	551.0	418.5	75.9	8.8	19
1959.....	528.0	383.1	72.9	8.0	18
Grand total.....	[a]7,261.0	4,781.1	65.8	100.0	.....

[a] Includes graduations 1918–40.
[b] Figure based on total number of graduates employed in 1928 plus graduations 1929–40.
[c] Graduations 1918–59.
Source: *NarKhoz–1960*, pp. 618, 747.

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ation of education, or family reasons particularly in the case of females). Obviously the stock of graduates prior to 1940 was more heavily affected by mortality (and World War II losses) than more recent graduating classes have been. In 1959 only about one-half of pre-1940 graduates were still gainfully employed in the national economy.

It should be noted again that the proportion of professionals employed in the national economy in 1959 from among graduates of various periods is invariably higher than that for semiprofessionals of any comparable period. This can be partly explained by the higher rates of withdrawals among semiprofessionals to continue their education.

From the data in table VI–19, it may be seen that about three-quarters of semiprofessionals among recent graduating classes (1958 and 1959) entered employment in the national economy. For professionals (table VI–18) the rate of employment was higher, with 86 percent of 1958 graduates employed in the national economy as of December 1959. There is a peculiar drop (to 77 percent) in the proportion of 1959 graduates employed at the end of the same year which cannot be readily explained.

From the data on employment, we can estimate the approximate composition of Soviet professional and semiprofessional manpower by age. Approximately 43 percent of the professionals employed in the national economy were 32 years old or older in 1959. About the same proportion of semiprofessionals were 27 years

TABLE VI–20.—*Professional graduates of Soviet higher educational establishments by field, 1928–59*

Soviet graduates with completed higher education by field of training	Approximate total number of graduates	Distribution of graduates in percent	Notes on Soviet categories of reporting graduates by field
Engineers of all types in industry, construction, manufacturing, mining, transportation, communication, and other industrial field professionals.	1,117,800	27.1	Includes about 85–90 percent engineers by American definition. Includes 10–15 percent, or about 110,000 to 160,000 graduates not commonly reported as engineers in American practice. These are primarily specialists in engineering economics (i.e., engineering management), as well as other categories (geology, engineering physics, geodetics, meteorology, etc.)
Agricultural specialists: agronomists, veterinarians, specialists in conservation, electrification, and mechanization of agriculture; forestry.	389,200	9.4	Includes 10 to 15 percent, or 38,000 to 58,000 engineers on electrification and mechanization of agriculture. The remainder are primarily agricultural fields specialists (agronomists, veterinarians, etc.)
Socioeconomic professionals in: economics, trade, accounting, banking, planning, statistics, jurisprudence, social and communal services.	322,700	7.8	About ½ of all graduates in this category are planning, accounting and economic managerial personnel. Includes 58,000 Communist Higher Party School graduates, trained as managerial personnel for industry and agriculture in the 1930's.
Educational professionals: teachers for all levels of schools and professors—foreign-language specialists, other cultural service professionals, art and music instructors and performers.	1,834,400	44.3	Includes about 300,000–350,000 university graduates, of whom about 55 percent, or 165,000–190,000 are natural and physical sciences and math. majors. Includes about 600,000–650,000 pedagogical institute graduates, of whom about 40 percent, or 240,000–260,000, are math., natural and physics science majors.
Health professionals in: medicine—therapeutic and preventive; dentistry, pharmacy, hygiene, professional coaching, and physical culture instructing.	465,200	11.3	Includes primarily medical field specialists (mostly physicians, who represent about 90 percent, or 420,000).
Total.....	4,129,300	100.0	
Among which trained in:			
Day and evening programs	3,433,200	83.1	
Extension-correspondence programs.	696,100	16.9	Predominantly teachers and educational field specialists

Source: Appendix table IV–A–1–G.

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old or older. Thus, over half of Soviet professionals and semiprofessionals were young men and women under 32 years old.

3. *Soviet Professional Graduates by Specialty Field*

Of the total number of the 1928–59 graduates, about 85 percent are still living, but of these, 20 percent are not active in the civilian labor force. Under the existing rates of attrition, only about two-thirds of the total number of graduates are presently employed in the category of workers and salaried employees.

Table VI–20 summarizes the aggregate training trends of Soviet professional graduates by field of specialization (branch specialties) in the years 1928–59. During this period the fields of education (44 percent) and engineering (27 percent) were particularly emphasized. Other fields—agricultural, socioeconomic, and health-medical—accounted for approximately 10 percent each of the total number of professional graduates. About 17 percent of all professionals trained were products of Soviet extension-correspondence programs, and most of them were in the educational field.

4. *Soviet Semiprofessional Graduates by Specialty Field*

Secondary semiprofessional schools in the Soviet Union train specialized supporting personnel who in many instances fill occupational slots similar to those occupied in the United States by college graduates. As pointed out in chapter III, it is difficult, however, to find an American equivalent for Soviet semiprofessional institutions. The only possible counterparts to the technicums are American technical institutes and junior colleges, particularly those of the vocational type. Unlike in the United States, Soviet semiprofessional school graduates are all regarded as specialists, and as meticulous a count is made of them as of the professionals with higher education. Table VI–21 summarizes the graduation trend of semiprofessional graduates over the last 30 years.

During the last three decades the principal emphasis in Soviet semiprofessional education has been on the training of industrial technicians and aides (34.5 percent), followed by education and health fields. Only about 7 percent of all semiprofessionals during this period were trained in extension-correspondence programs.

TABLE VI–21.—*Graduates from Soviet semiprofessional schools by field, 1928–59*

Specialty field	Number (thousands)	Percent
Engineering-industrial	2,450.3	34.5
Agriculture	1,053.8	14.9
Socioeconomic	521.8	7.4
Educational-cultural	1,662.7	23.5
Health-medicine	1,395.4	19.7
Total	7,084.0	100.0
Regular	6,599.3	93.2
Extension-correspondence	484.7	6.8

Source: Table III–19.

5. *Historical Trends in United States-U.S.S.R. Professional Manpower Flow*

In the United States there is no category of graduates comparable to those from Soviet semiprofessional schools, but such comparability does exist in the field of higher education, and it is therefore possible to make comparisons of the flow of professional higher education graduates in the U.S.S.R. and the United States. This is done in table VI–22.

At the professional level, the Soviet Union produced during the 3 decades 1928–59 4,129,300 graduates from higher educational institutions, or about 40 percent less than were trained in colleges and universities in the United States during a comparable period (1926–58—6,871,000). In spite of this, the Soviet Union graduated 1.8 times as many engineers as did the United States. There were 2.4 times as many agricultural field graduates in the Soviet Union as in the United States. While in all health fields put together the number of Soviet and American graduates was about the same,[21] in medicine

[21] Table VI–22 does not indicate the number of graduates in all health fields, and they are included in the "other fields" total. The U.S. trained 469,700 in health fields, among whom 181,700 were medical doctors, 77,500 dentists and 210,500 other health field specialists—nurses (in the U.S.S.R. these are considered semiprofessionals; about 1,000,000 were trained during the period 1928–59), laboratory technicians, etc.

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TABLE VI–22.—*Professional graduates with completed higher education in the U.S.S.R. and college graduates in the United States*

Field	U.S.S.R. (1928–59)	U.S. (1926–58)	Comparison and notes
Engineering	1,117,800	620,300	U.S.S.R. trained 1.8–fold as many as United States. Soviet reporting is inflated, in comparison with United States figure, by about 15 percent by inclusion of some other science fields (about 10 percent))and graduates in economics (about 5 percent) normally reported elsewhere in United States practice.
Medical doctors	420,000	181,700	U.S.S.R. trained 2.4–fold as many as United States. Physicians only (M.D. equivalent) were included in U.S.S.R.'s figure.
Agricultural specialists	389,200	166,400	U.S.S.R. trained 2.4–fold as many as United States
Science majors, total	430,000	704,400	United States trained 1.6–fold as many as U.S.S.R. The category includes chemistry, physical sciences and mathematics, earth sciences (geology, etc.), and biology. In the U.S.S.R. some of the majors in these fields are also found among engineering specialties above.
among these from:			
universities	180,000	.....	
pedagogical institutes.	250,000	.....	
Total, engineering, applied and theoretical science fields.	2,357,000	1,672,800	U.S.S.R. trained 1.4–fold as many as United States
All other fields: humanities, social sciences, teacher training in nonscientific fields, arts, etc.	1,772,300	5,198,600	United States trained 2.9–fold as many as U.S.S.R. There was greater diversity of training in the United States, with heavy emphasis on business and commerce, social sciences and jurisprudence
Grand total	4,129,300	6,871,400	United States trained 1.7–fold as many as U.S.S.R.

Sources and notes: Soviet figures from table VI–20 in the text above; figure for medical doctors and science majors are estimates net of other professionals in the respective reporting category. (See notes in table VI–20). American figures were derived by addition from data reported by periods (for 1926–53) in Wolfle, *America's Resources of Specialized Talent*, pp. 294–95; and brought up to date by addition of graduates in 1954–58 reported in: U.S. Dept. of Health, Education and Welfare, Office of Education, *Earned Degrees Conferred by Higher Educational Institutions*, Washington, D.C.: U.S. Government Printing Office, annual issues for 1954 through 1958.

alone, 2.4 times as many "physicians" were graduated in the U.S.S.R. than medical doctors in the United States. The United States trained about 270,000 more persons in the aggregate number of graduates with science majors than were trained in Soviet university and pedagogical institute programs.

While the Soviet training of specialists in engineering, medical and agricultural occupations proceeded rapidly, the number of higher education graduates trained in other fields was relatively small. In all other fields, United States colleges and universities trained almost three times as many as did Soviet higher educational establishments. In the social science fields the Soviet Union trained only about one-tenth as many persons as were trained in these fields in the United States. In the humanities, liberal arts, and other miscellaneous fields, Soviet higher education trained but a small fraction of the number of persons trained in these fields in American colleges and universities. A comparison of graduations by field in the two countries is made in chart XXXIII.

The comparisons made above clearly indicate that while the United States made a greater effort to provide higher education for a larger number of people in various nonspecialized fields, and thus to promote the aims of general higher education, the Soviet Union proceeded with the buildup of specialized professional manpower resources primarily in scientific and applied fields, and largely at the expense of general education. While American higher education provided more opportunity for general higher education, it lagged by a factor of 1 to 1.4 behind the Soviet effort in training engineers, scientists and applied-science specialists.

Many prominent leaders in the United States have commented in recent years on the Soviet

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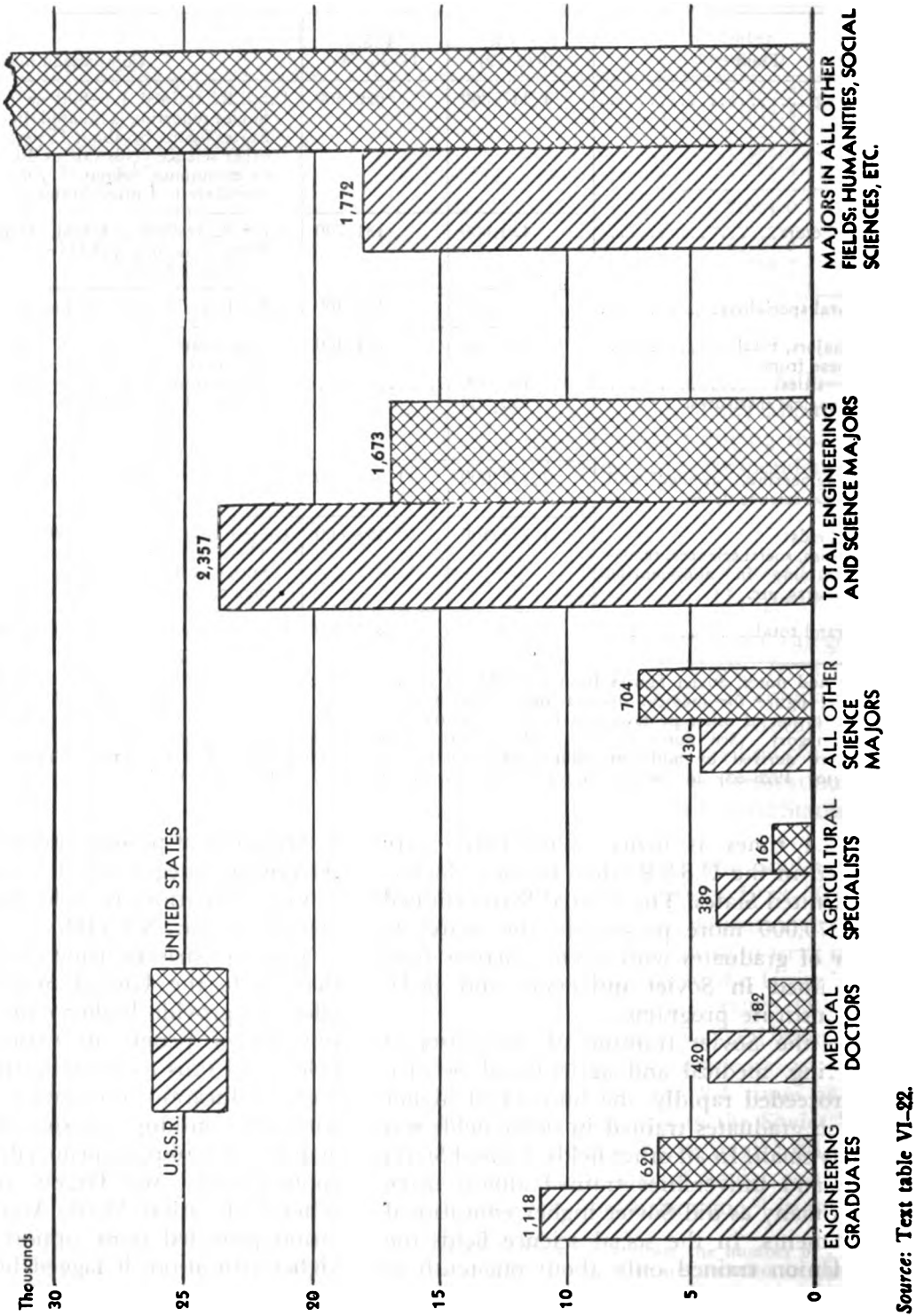
CHART XXXIII.—COMPARISON OF GRADUATES FROM SOVIET HIGHER EDUCATIONAL ESTABLISHMENTS, 1928–59, AND FROM U.S. COLLEGES AND UNIVERSITIES, 1926–58, BY FIELD



Source: Text table VI–22.

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commitment to education and the training of professional manpower. The real issue may have been overlooked, however—*Soviet commitment to what kind of education?* The historical trends just summarized indicate, without any qualification whatsoever, that in terms of the numerical rates of training professionals, the U.S.S.R.'s emphasis has been uniquely oriented toward the production of specialists in engineering and applied science fields. The recent educational reforms have made this orientation even more pronounced. The numerical rates of training engineers and engineering technicians for Soviet industry will probably continue unabated, as indicated by the summary data in table VI–23. As indicated by these data, in the early 1960's engineers will be trained at the rate of 126,000 per annum. Industrial technicians and aides will be turned out at a rate almost twice as high, i.e., 240,000 annually.

The recent enormous disadvantage of the United States vis-a-vis the Soviet Union in the numerical rates of training engineering and science graduates has given Soviet propagandists a heyday.[22] They claim that this proves the "superiority" of the Soviet educational system over the American system. This point is highly debatable. A much more serious issue remains, however. Soviet leaders firmly believe that the competition between capitalist democracies and the communist world will be decided in the field of science and technology. This provides the rationale for their own emphasis on engineering and the sciences in their professional training programs. If we take the communist threat in international power politics seriously, as we must, the issue of America's adequacy in engineering and scientific education—in quantitative as well as qualitative terms—becomes of central importance. There must be no misunderstanding or underestimation of the Soviet scientific and technical manpower buildup. It has become the principal source of communist strength, in spite of the denial to the Soviet people of educational opportunity in other fields of human knowledge—the humanities, the social sciences and other areas of general and liberal higher education.

[22] There are literally hundreds of stories in the Soviet press on this subject. See, for example, Khrushchev's speech, *Pravda*, Jan. 15, 1960.

TABLE VI–23.—*Annual average number of Soviet professional and semiprofessional graduates in all fields and graduates of engineering-industrial branches*

[In thousands]

Periods	Professional higher education		Secondary semiprofessional specialized education		Total	
	All fields	Engineering	All fields	Technical	All fields	Engineering-technical
1959–65 projection (average per annum)	335	126	(485)	(240)	(820)	(366)
1959	340	106	520	254	860	360
1955–60 average (originally planned)	(289)	(101)	(450)	(228)	(739)	(329)
1952–58 average	248	66	408	168	656	234
1958	290	94	549	256	839	350
1957	267	83	504	206	771	289
1956	260	71	510	220	770	291
1951–55 average	224	52	312	120	536	172
1946–50 average	130	27	256	78	386	105
Maximum pre-war	126	37	240	53	.....	.....
(year)	(1940)	(1935)	(1938)	(1933)	.....	.....

Sources and Notes: All figures except those in parentheses are from appendix tables III–A–1–G; IV–A–1–G and IV–A–2. The 1955–60 average is estimated on the basis of the original announcement of the Fifth Five-Year Plan (*Pravda*, Feb. 26, 1956), enrollments as of 1955 and known success rates of students. The 1959–65 annual average for total graduates is that announced by Eliutin in *Uchitel'skaia gazeta*, May 16, 1958, for the 1960–65 period. Semiprofessional graduates are derived as a residual. See projections in appendix tables VI–B–4–P and VI–B–4–SP.

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6. *Long-Run Trends in the Stock, Flow and Losses among Soviet Professionals and Semiprofessionals by Field*

Charts XXXIV and XXXV depict the growth of Soviet professional and semiprofessional manpower by field of training employed in the national economy in various years, 1928–59, and projections for 1965. Tables VI–24 and VI–25 present data on the stocks of professional and semiprofessional graduates at year ends 1927 and 1957, and on the flow of graduates during the 1928–57 period. The Soviet Union trained during this 30-year period 3,731,600 professionals with completed higher education and 6,300,800 semiprofessionals with intermediate-level specialized education.

In the course of the same period one-fourth (or 927,000) of all the professionals were lost to the civilian economy due to the extreme hardships of forced industrialization and collectivization, the heavy losses caused by the political purges and the Second World War, by old age retirement, disability, death, transfer to the military establishment, or other reasons. The total losses of semiprofessionals were even higher, numbering 2,285,000, or a 36 percent

TABLE VI–24.—*Thirty-Year trend (1927–57) in the supply and attrition of Soviet professionals by field*

Branch specialty	Year end 1927	Graduates 1928–57	Hypothetical total year end 1957	Actual number as of December 1957	Losses and attrition rate during 30-year period: Losses (number)	Losses and attrition rate during 30-year period: Attrition in percent of total additions
Engineering-industrial.....	47,000	918,200	965,200	816,000	—149,200	15.5
Agricultural.....	28,000	324,300	352,300	193,000	—159,000	45.2
Socioeconomic.....	26,000	219,800	245,800	215,000	—30,800	12.5
Educational-cultural.....	59,000	1,569,200	1,628,200	1,145,000	—483,200	30.8
Health-medical.....	63,000	409,200	472,200	346,000	—126,200	26.7
Total.....	223,000	3,440,700	3,663,700	2,715,000	—948,700	27.6
Unaccounted residual.....	10,000	57,900	67,900	90,000	+22,100	.....
Grand total.....	233,000	3,498,600	3,731,600	2,805,000	—926,600	24.8

Sources: *SSSR—Tsif—1958*, p. 317; *Vestnik statistiki*, No. 7, 1958, p. 87; *NarKhoz—1959*, pp. 674, 690; appendix table IV–A–1–G.

TABLE VI–25.—*Thirty-Year trend (1927–57) in the supply and attrition of Soviet semiprofessionals by field*

Branch specialty	Year end 1927	Graduates 1928–57	Hypothetical total year end 1957	Actual number as of December 1957	Losses and attrition rate during 30-year period: Losses (number)	Losses and attrition rate during 30-year period: Attrition in percent of total additions
Engineering-industrial.....	51,000	1,934,400	1,985,400	1,257,000	—728,400	36.6
Agricultural.....	31,000	866,500	897,500	310,000	—587,500	66.4
Socioeconomic.....	8,000	422,600	430,600	314,000	—116,600	27.1
Educational-cultural.....	137,000	1,541,100	1,678,100	971,000	—707,100	42.1
Health-medical.....	48,000	1,248,200	1,296,200	980,200	—316,200	24.4
Total.....	275,000	6,012,800	6,287,800	3,832,000	—2,455,800	39.0
Unaccounted residual.....	13,000	.....	13,000	184,000	+171,000	.....
Grand total.....	288,000	6,012,800	6,300,800	4,016,000	—2,284,800	36.2

Sources: *SSSR—Tsif—1958*, p. 318; *Vestnik statistiki*, No. 7, 1958, p. 88; *NarKhoz—1959*, pp. 674, 690; appendix table III–A–1–G.

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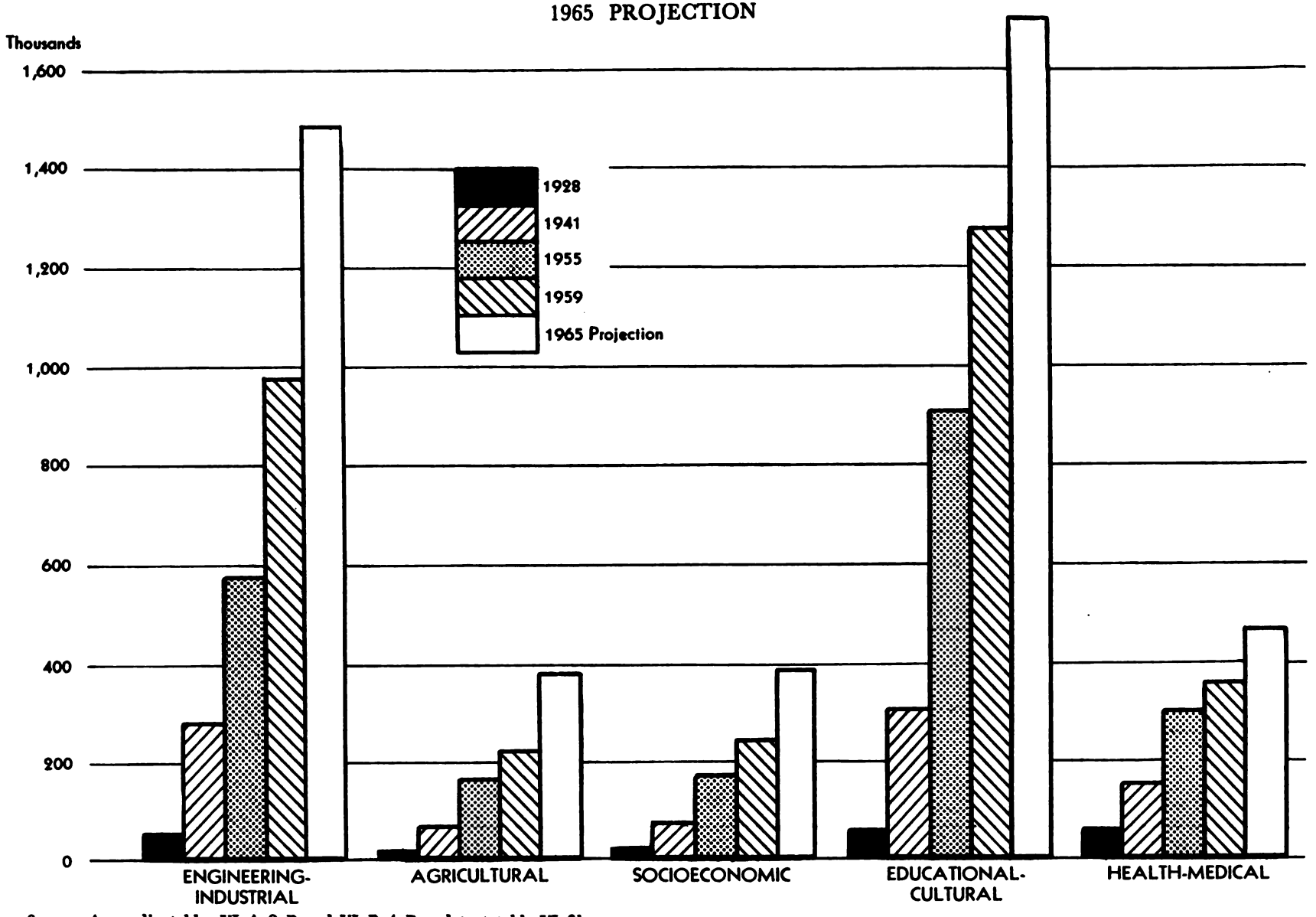
CHART XXXIV.—GROWTH IN THE STOCK OF SOVIET PROFESSIONAL MANPOWER, BY FIELD, 1928–59 AND 1965 PROJECTION



Source: Appendix tables VI–A–2–P and VI–B–4–P and text table VI–31.

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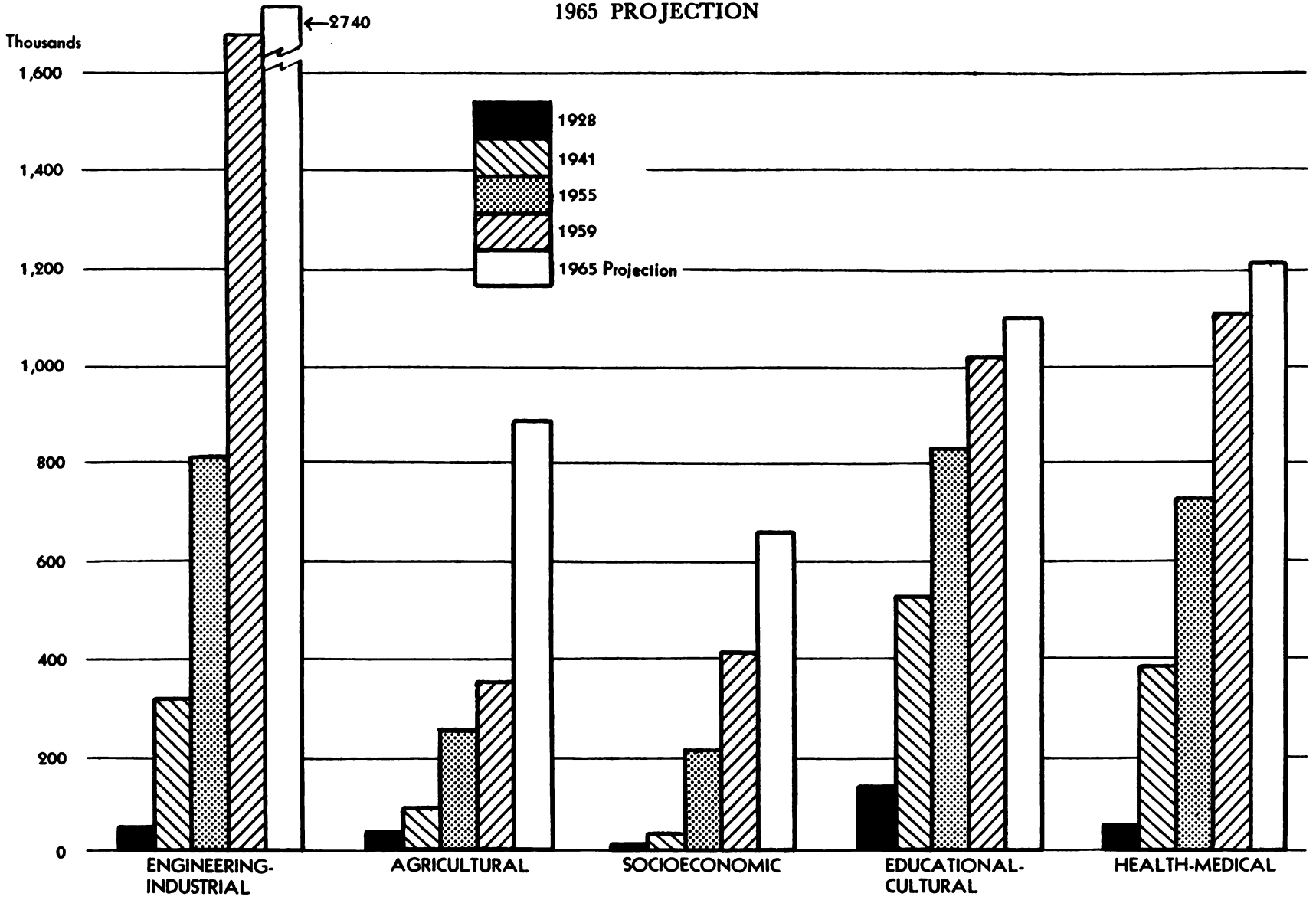
CHART XXXV.—GROWTH IN THE STOCK OF SOVIET SEMIPROFESSIONAL MANPOWER, BY FIELD, 1928–59 AND 1965 PROJECTION



Source: Appendix tables VI–A–2–SP and VI–B–4–SP and text table VI–30.

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attrition rate due to all causes. In the case of the semiprofessionals, however, substantial withdrawals (possibly 10 to 12 percent) were undoubtedly caused by enrollment in higher educational institutions. As a result, some of those initially trained as semiprofessionals subsequently entered the ranks of professionals.

In the immediate future the aggregate attrition rates among Soviet professionals are expected to follow historical trends. The number of professionals employed as of January 1959 was 3,027,000 [23]; graduations during the period 1959-65 are anticipated to reach 2,345,000; and 4,500,000 professionals are expected to be employed on January 1, 1966.[24] Consequently, the attrition of professionals from the civilian labor force during the 7-year period (January 1959 through January 1966) will be about 870,000, or 25.6 percent of the 1959 stock. The average annual attrition rate will thus be about 3.3 percent. About 38 percent of the new graduates will be used to cover the losses which will occur during this period.

The attrition rates in specific fields varied markedly during 1927–57. While the overall average rate was 25 percent for professionals, it was substantially higher in the agricultural and educational-cultural fields. While a certain number of agricultural graduates may have been reclassified as engineering and socioeconomic specialists, this in itself would not explain the particularly heavy losses among higher education graduates in agriculture. Apparently war losses and withdrawals, particularly to the military establishment, were exceptionally heavy in this field.[25] The high attrition rate in the educational-cultural field was probably due to the high withdrawal rate of women from gainful employment in this field.

The semiprofessional specialty fields in which losses were abnormally high are identical with those in the professional categories, though the rates of attrition among semiprofessionals were even higher. In agriculture the attrition of semiprofessionals was 66 percent of the personnel trained during the same 30-year period. In the education field it was 42 percent, but in the remaining branches the rates were the same as (engineering-industrial fields), or below (socioeconomic and medical fields) the average for all branches.

The attrition rates for several recent years (1955 through 1959) for both professionals and semiprofessionals by specialty branch were estimated in the appendix to this chapter, and they are summarized in table VI–26 below. Any interpretation of these data is hazardous because the picture is obscured by the influx of personnel discharged from the military establishment into employment in the civilian economy and possible reclassification of fields. It is noteworthy, nevertheless, that the agricultural field particularly and education have followed the historical pattern of unusually high annual at-

[23] Appendix table VI–A–1.
[24] *Eliutin-VSSS–1959*, pp. 90, 96; appendix tables IV–A–4 and VI–B–4–P.
[25] This is particularly true of agricultural mechanization engineers, who are absorbed in large numbers into armored and artillery units of Soviet ground forces.

TABLE VI–26.—*Annual attrition rates among Soviet professionals and semiprofessionals by specialty branch, 1955–59*

Specialty branch	Professionals			Semiprofessionals		
	1955; 1956	1957	1958; 1959	1955; 1956	1957	1958; 1959
Engineering-industrial	negligible	1.6	1.9	8.7	negligible	4.2
Agriculture	9.2	positive 9.3	9.5	18.4	positive 23.1	21.8
Socioeconomic	negligible	1.6	1.2	1.0	.8	.9
Educational-cultural	2.1	7.3	5.4	3.1	5.1	3.9
Health-medical	1.1	2.2	3.3	positive 2.3	1.1	1.9
All fields	1.4	3.6	3.6	3.8	3.0	3.9

Sources and notes: Appendix tables VI–B–2–P (note that losses for 1955–56 are given in that table for 2 years); VI–B–3–P; VI–B–2–SP (again note that losses for 1955–56 are given in that table for 2 years); and VI–B–3–SP; VI–B–5–P; and VI–B–5–SP; In these two latter tables, the attrition rates are given for 2 years.

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trition rates. Furthermore, it appears that the engineering and medical fields are most strikingly affected by transfers of military personnel to civilian employment; this in turn explains the very low, or even positive, rate of attrition in these fields. A "positive" rate of attrition means that additions to the stock were larger than the number of graduates trained in the course of the year, so that transfers plus new graduates not only covered losses incurred during the year but were sufficient to produce a surplus over the preceding year's stock.

In addition to transfers from the military establishment, the influx in the mid-1950's of discharged political prisoners from Soviet concentration camps may also have been a factor in reducing annual attrition rates.

7. *Long-Run Trend in Growth and Distribution of Soviet Specialized Manpower by Field*

During the 30-year period 1927–57, the growth of specialty fields was markedly uneven. This variance is indicated in the summary below:

TABLE VI–27.—*Growth factor of stock of graduates employed in the national economy of the U.S.S.R., 1957 vs. 1927*

Branch specialty	Factor of growth	
	Professionals	Semiprofessionals
Engineering-industrial..	17.4	24.6
Agricultural.....	7.2	10 0
Socioeconomic.....	8.3	39.3
Educational-cultural...	19.4	7.1
Medical-health.....	5.5	20.4
All fields.....	12.1	13.9

Sources: Appendix tables VI–A–2–P and VI–A–2–SP.

On the average, professional and semiprofessional manpower in all fields increased twelvefold and fourteenfold respectively. The officially sought 1:2 or 1:3 ratio of professionals to semiprofessionals was thus never met in a majority of the branch specialties. Engineering-industrial and educational-cultural fields showed the most rapid rate of growth among professional branch specialties. Among semiprofessionals it was the engineering-industrial (technicians), health-medicine (hospital aides, nurses, etc.) and socioeconomic (trade and distribution) fields.

As indicated in tables VI–28 and VI–29, the emphasis upon these fields of specialization resulted in a substantial redistribution of professional and semiprofessional graduates employed in the civilian economy.

By 1957, engineering and education had become the dominant fields among professionals.

TABLE VI–28.—*Composition of Soviet professional manpower by branch of specialization as of 1927 and 1957*

Branches	Composition in percent	
	Year end 1927	Dec. 1, 1957
Engineering-industrial..	20.2	29.1
Agricultural.....	12.0	6.9
Socioeconomic.....	11.1	7.7
Educational-cultural...	25.4	40.8
Health-medical.....	27.0	12.3
Total.....	95.7	96.8
Other: undistributed residual	4.3	3.2
Grand total....	100.0	100.0
Total number of professional graduates	233,000	2,805,000

Sources: Appendix table VI–A–2–P and text table VI–24; *SSSR-Tsif–1958*, p. 317; *NarKhoz–1959*, p. 674.

TABLE VI–29.—*Composition of Soviet semiprofessional manpower by branch of specialization as of 1927 and 1957*

Branches	Composition in percent	
	Year end 1927	Dec. 1, 1957
Engineering-industrial..	17.7	31.3
Agricultural.....	10.8	7.7
Socioeconomic.....	2.8	7.8
Educational-cultural...	47.5	24.2
Health-medical.....	16.7	24.4
Total.....	95.5	95.4
Other: undistributed residual.....	4.5	4.6
Grand total....	100.0	100.0
Total number of semiprofessional graduates.....	288,000	4,016,000

Sources: Appendix table IV–A–2–SP and text table VI–25; *SSSR-Tsif–1958*, p. 317; *NarKhoz–1959*, p. 674.

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Among semiprofessionals, the engineering-industrial, health-medical and education fields were the most sizeable specialty branches and accounted jointly for over four-fifths of all semiprofessional graduates.

8. *Stock of Soviet Specialized Manpower in 1960 and 1965 Projection*

During the current Seven-Year Plan (1959–65), the emphasis on the training of professionals in engineering and scientific fields, and of semiprofessionals for industry and other supporting jobs in applied science fields (agriculture, health) is expected to continue. Tables VI–30 (semiprofessionals) and VI–31 (professionals) summarize the statistics on the numbers of specialists currently employed in the various fields (specialty branches) of the Soviet economy; included are projections for 1966.

It is expected that the proportion of engineers among the professional graduates will continue to increase, with the result that by 1966 one-third of all Soviet professionals will have had such training. Industrial technicians and aides will increase at an even more rapid rate; according to the current plans, their proportion will rise to two-fifths of all semiprofessional graduates. The proportion of specialists in both the professional and semiprofessional categories in the agricultural and socioeconomic fields is expected to increase by 1 or 2 percent. On the other hand, despite substantial numerical gains, a marked decline is forecast in the proportion of educational-cultural graduates and health-medical field specialists. Thus during the early 1960's, the trends described earlier as the third phase of the Soviet professional manpower development—namely, the shift of emphasis from social service occupations to production-oriented

TABLE VI–30.—*Soviet semiprofessional labor force by specialty branch, January 1960 and 1966 projection*

Specialty branch	Estimated number employed as of January 1960		Projected number employed as of January 1966	
	Thousands	Percent	Thousands	Percent
Engineering-industrial	1,685.0	34.8	2,739.6	40.7
Agricultural	461.3	9.6	885.9	13.2
Socioeconomic	389.1	8.1	658.0	9.8
Educational-cultural	1,045.0	21.6	1,092.9	16.3
Health-medical	1,077.5	22.3	1,203.4	17.9
Total	4,657.9	96.4	6,579.8	97.9
Unexplained residual	173.1	3.6	144.0	2.1
Official grand total	4,831.0	100.0	6,723.8	100.0

Source: Appendix table VI–B–4–SP.

TABLE VI–31.—*Soviet professional labor force by specialty branch, January 1960 and 1966 projection*

Specialty branch	Estimated number employed as of January 1960		Projected number employed as of January 1966	
	Thousands	Percent	Thousands	Percent
Engineering-industrial	973.4	29.5	1,478.8	32.8
Agricultural	247.8	7.6	392.4	8.7
Socioeconomic	252.6	7.7	396.1	8.9
Educational-cultural	1,347.6	41.0	1,698.4	37.7
Health-medical	383.2	11.6	463.1	10.3
Total	3,204.6	97.4	4,428.8	99.4
Unexplained residual	85.5	2.6	70.0	1.6
Official grand total	3,290.1	100.0	4,498.8	100.0

Source: Appendix table VI–B–4–P.

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(industry-agriculture) fields—will be accelerated further.

According to Premier Khrushchev, 4.5 million specialists with completed higher education will be employed in the national economy of the U.S.S.R. in January 1966.[26] This figure is approximately the same as the figure in the projection derived under the assumed attrition rate of 3.5 percent (appendix table VI–C–4–P and table VI–31 above), and if realized, would constitute a net increase of 1.5 million over the 1959 total. Since during the plan period 1959–65 2.3 million are expected to be graduated, the total losses during the period 1959–65 should be 800,000, which is an annual attrition rate of about 115,000, or again a 3.5 percent attrition per annum. Thus every year one-third (35 percent) of the classes graduating from Soviet higher educational institutions will constitute, in effect, replacements for persons who for one reason or another leave the ranks of employed professionals.

In regard to semiprofessionals, the 1965 planned figure is 6.5 million,[27] as against the 6.7 million estimate made in this study. Since the number of semiprofessional graduates during the 7-year period is expected to be 3.2 million, and the stock in December 1958 was 4,449,000, expected losses should be about 950,000 to 1,150,000, or one-third of the new graduates during the 7-year period. According to the projections of Soviet planners themselves, these high rates of attrition will continue even though one would normally expect them to decline because of the influx of graduate specialists in the younger age bracket.

Our projections do not take into account the possible numerical increase of the Soviet professional labor force due to a transfer of manpower from the Soviet armed forces. Should an appreciable reduction in the size of the armed forces take place, some of the 360,000 professionals now employed by the military might find their way into the civilian labor force. As of summer 1961, however, further military manpower cuts, originally indicated by the Soviet leaders, were terminated.

[26] *Pravda*, Jan. 28, 1959; appendix table VI–A–1.
[27] Kotov, *Voprosy*, p. 133; appendix table VI–A–1.

Growth of the Soviet Labor Force of Workers and Employees and Employment of Specialized Personnel

In the last three decades the formation of the Soviet industrial labor force proceeded rapidly. During this formative period, *formal* training of one sort or another and on all levels—from skilled laborer to engineer, from technician to research scientist—was an urgent and indispensable requirement. This is of course generally true in any rapidly industrializing society where traditionally acquired skills and experience are scarce. Formal training, then, has been the major means of expanding the Soviet industrial labor force, and the educational system of the U.S.S.R. has been shaped and modified over the years so as to satisfy the demands of a totalitarian system bent on transforming an agricultural state into an industrial power. It was primarily because of this pressure to industrialize—aside from various political and ideological rationalizations—that formal training acquired such a prominent place in the Soviet Union, and a major reason why formal educational criteria began to play such a significant part in the determination of the occupational and social status of the Soviet citizen.

Specialists employed in the national economy of the U.S.S.R. are officially a part of the Soviet labor force of "workers and salaried employees." This concept includes all persons employed in manufacturing industries, in mining and construction, in transportation, communication, trade and distribution, in banking, accounting, planning, insurance and credit institutions, in state agricultural farms, and in education and health services.[28] It excludes collective farmers and most other agricultural labor, military personnel, forced labor, and certain other minor groups. However, all professionals and semiprofessionals employed on collective farms, machine tractor stations, state farms and subsidiary agricultural enterprises are reported in the category of workers and employees. Table VI–32 presents data on the number of workers and

[28] For a more precise definition, see W. W. Eason, "Population and Labor Force," in A. Bergson (ed.), *Soviet Economic Growth*, Evanston, Ill.: Row, Peterson & Co., 1953; A. D. Redding, "Volume and Distribution of Nonagricultural Employment in the U.S.S.R., 1928–55," *The American Slavic and East European Review*, vol. XIII, No. 3 (Oct. 1954), 365–67.

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TABLE VI–32.—*Comparison of growth of the Soviet labor force of workers and employees and specialized manpower, 1928–59 and 1965 projection*

Year end	Number of workers and employees (millions)	Total number of professionals and semiprofessionals with completed specialized education (thousands)	All trained specialists per 1,000 workers and employees	Number of professionals in all fields (thousands)	Professionals per 1,000 workers and employees
1928	10.8	529.0	49.1	233.0	21.5
1932	22.6	1,366.1	60.5	462.4	20.5
1937	26.7	2,188.8	82.2	748.8	28.1
1940	31.2	2,400.0	76.7	908.8	29.1
1955	48.3	5,133.0	106.6	2,184.0	45.3
1958	54.6	7,476.0	137.0	3,027.0	55.5
1959	56.5	8,017.0	142.0	3,236.0	57.2
1965 Projection	66.0	11,224.0	171.0	4,500.0	68.2

Sources: *NarKhoz–1959*, pp. 657–59, 673; *Pravda*, Feb. 8, 1959; *NarKhoz–1960*, pp. 588, 602; text table VI–11; appendix tables VI–A–1, VI–B–4–P, VI–B–4–SP.

employees and relates the supply of specialized manpower to aggregate employment.

As table VI–32 indicates, the Soviet labor force of workers and employees increased about five times between 1928 and 1958, from about 11 million to about 55 million persons. While in 1928 the labor force of workers and employees represented about 10 percent of the total labor force, and about 7 percent of the total Soviet population, by 1958 it accounted for about one-half of the total labor force and approximately one-fourth of the total population.

The data in table VI–32 also show that during the period 1928–58 the *specialized manpower* component of Soviet workers and employees increased from about 529,000 to 7,476,000, or approximately fourteenfold. Thus the formation of specialized manpower proceeded at a rate three times faster than the growth of the whole work force of workers and employees. The number of professionals also increased about fourteenfold (1928—233,000; 1958—3,027,000). While specialized manpower accounted for 5 percent of Soviet workers and employees in 1928, three decades later it accounted for about 15 percent of the total number of workers and employees. Professional manpower composed of Soviet higher education graduates grew from 21 persons per 1,000 employees to 55 per 1,000 in 1958, and in 1959 improved further to 57 per 1,000 workers and employees.

The projection for 1965 indicates that these trends will continue at an accelerated rate, and that the total numbers of specialized personnel and of professionals with higher education will account by January 1966 for 17 percent and 6.8 percent, respectively, of all Soviet workers and employees.

Soviet Placement Policies and the Role of the Communist Party in the Selection of Executive Personnel

In return for free education the Soviet state exacts from professional, semiprofessional and vocational school graduates obligatory service in an assigned job in the national economy. Thus skilled and semiskilled laborers graduated from schools of the State Labor Reserve system receive usually 4-year job assignments, and semiprofessional school and higher education graduates are generally committed to 3 years of assigned work. As an exception, some graduates, particularly from higher educational institutions, are permitted to seek jobs on their own, but the occurrence of such self-placement (*samoustroistvo*) is rare. A new graduate cannot be hired by any employer unless he has in his possession a special permit issued by the educational establishment from which he has been graduated.

Job assignments for higher education graduates are handled by the individual institutions,

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which set up for this purpose personnel placement commissions (*komissii personal'nogo raspredeleniia*). Here the students are screened and selected for jobs in accordance with the rosters prepared for each institution by the Ministry of Higher and Secondary Specialized Education.[29] These rosters are prepared by the Ministry in accordance with the requests of the State Planning Committee and its Office of Training and Placement of Newly Graduated Specialists.[30] Having spent some time on an assigned job, a person may venture to leave,[31] arrange for a legitimate transfer, or possibly be asked or ordered to take another job. While according to the Soviet Constitution, citizens have the "right" to employment, they must not "wrongly understand the right to work to mean the right of choosing their employment in disregard of the interests and needs of the state." [32] People do change jobs in the Soviet Union, but there are a great many devices which the state can employ if it really wants to retain a person on a certain job. Still, in spite of restrictions, there is horizontal mobility (from one job to another, from one place of employment to another within a given locality or between localities) among Soviet professional, semiprofessional, and other kinds of labor.

The question of upward mobility, however, is much more complicated. As long as a person does not seek a position of responsibility, the Communist Party and the security police enter the picture only in secondary roles. It is the management's task to see to it that a person performs his functions satisfactorily, and the party merely reminds the individual that his performance should "improve"; the security police make certain that he does not by deed or word express opposition to the regime. However, once the Soviet citizen enters a supervisory position or other job of responsibility, the Communist Party comes directly into the picture.

How people are appointed to high managerial or administrative positions in the Soviet Union has remained an enigma, despite the outpouring of scholarly books on the operation of the Soviet Government, industry and social services. Little is also known of the procedure by which the Communist Party organs exercise their control over appointments to managerial and administrative jobs.[33] Largely because of the lack of information, little attention has been paid in Western studies to the role of the Communist Party in controlling personnel policies. The detailed operational features of personnel appointment practices are badly in need of further study, but their general aspects may be summarized as follows.

The Central Committee of the Communist Party of the U.S.S.R. works out lists of jobs (nomenclature or *nomenklatura*) which may not be filled without the consent of the party's regional committees or the republic or U.S.S.R. central committees. This procedure was instituted in the early 1930's and the number of jobs on such lists has been increasing steadily.[34]

The term "nomenclature" actually refers to job positions of certain importance and not to the list of names. Personnel records (the so-called lists of cadres of one type or another) are kept separately in party (i.e., the Central Committee and/or regional party units) files and these represent the pool from which nomenclature jobs are filled.

There are of course many gradations in nomenclature jobs, and precisely which of the local, regional, republic or all-union party committees have jurisdiction over appointments to which jobs is specified in the lists. Managerial jobs, heads of divisions and departments of vari-

[29] The Ministry has in its structure an Office for the Planning of Training and Placement of Newly Graduated Specialists (*VyshkoSPR—1957*, p. 18). Depending on the anticipated demand for various specialists, this office also sets admission quotas for each individual institution 4 to 6 years in advance.

[30] This office was reported to have a staff of 30 persons in 1956 (*Direktivy-SBX*, vol. IV, p. 297). It acts as a central coordinating and clearing house office, functioning in cooperation with an office of a similar name in the Ministry of Higher and Secondary Specialized Education. Other ministries, administrations, regional economic councils and local units also have personnel planning offices. Thus there is a hierarchy of personnel planning and placement bodies on local, regional and national levels.

[31] During the period 1940–58 draconic laws were in existence in the U.S.S.R. penalizing such unauthorized departures by reductions in wages and retirement, medical care and paid vacation benefits, as well as by "criminal" action which could result in imprisonment or exile to a concentration camp. These penalties have been relaxed in recent years.

[32] *Pravda*, Jan. 22, 1941.

[33] One attempt to deal with this problem has been made by J. F. Hough, *The Role of the Local Party Organization in Soviet Industrial Decision-Making*, unpubl. Ph.D. thesis, Harvard University, 1961. See also an article by the same author, "The Technical Elite vs. the Party—a First-hand Report," *Problems of Communism*, Vol. VIII, No. 5 (Sept.–Oct. 1959), 56–59.

[34] In 1954, for example, the jobs of collective farm chairmen and their deputies were added; see *Direktivy SBX*, vol. IV, p. 190.

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ous administrations, trusts and large economic units are listed in the nomenclature of the Central Committee of the Communist Party of the Soviet Union. Jobs of plant directors, their deputies, and certain other managerial positions within the plant such as chief engineers, office heads and shop superintendents of "key" plants which are either large or else considered "important" are also listed in the nomenclature of the Central Committee of the CPSU. In other words, the job of chief engineer in a large manufacturing plant cannot be held by anyone without prior clearance and "assignment consent" by the Central Committee of the CPSU. Similar types of jobs, though in smaller or less important plants, appear in the nomenclature of the union-republic party Central Committee. The jobs of collective farm chairmen are controlled by regional committees, and the jobs of deputy chairmen of a collective farm are in the nomenclature of the district (*raion*) party committees.

Which job positions are listed in which nomenclature, however, is still largely an unexplored subject and requires further extensive study. It is certain that the types of positions which are included in the nomenclature of one rank or another run into the hundreds. The total number of jobs thus controlled through nomenclature may well run into several million. Among these, many thousands are directly controlled by the highest party organ, the Central Committee of the CPSU.

The selection and appointment process based on this nomenclature system functions approximately as follows. A job which has been placed in the nomenclature cannot be filled without the consent of the respective party committee. Thus, for example, a director of a large plant somewhere in the Urals, if this job is listed in the nomenclature of the Central Committee of the CPSU, cannot be appointed by the respective ministry or regional economic council without prior approval of the candidate by the Central Committee. Similarly, if a man who holds such a position is to be dismissed or transferred, the Central Committee must be notified and must consent to the dismissal or transfer in advance.

What happens behind the walls of party headquarters when an appointment is to be made is a matter of conjecture. The respective party offices have a listing of jobs and a pool of trusted personnel which they somehow try to match. Knowing the roster of jobs the party controls, we may assume also that the party office is actively on the look-out for potential candidates for responsible jobs, and once the vacancy exists, the chosen man is called to fill the job. Otherwise, if a man is proposed by a higher administrative body, such as a ministry or regional economic council, the respective party unit is given the chance to check the prospective appointee's record and determine his acceptability.

Occasionally we get glimpses of this process. The Soviet press has sometimes expressed criticism to the effect that party bureaucrats are not acquainted with the business ability of appointees, and that replenishment of the pool of potential appointees proceeds slowly.[85] Personal friendship and family ties may also be brought into play. In any case, however, control or veto power of the Communist Party organs over the filling of responsible managerial and administrative jobs through the nomenclature practice cannot be doubted. It is also evident that the more responsible the job, the higher the rank of the nomenclature in which it is listed, and the higher the party organ entrusted with its disposition.

These procedures are applied to all segments of the Soviet labor force. School directors cannot be appointed without the consent of the regional committees of the party. Directors of higher educational establishments, deans of universities, and heads of research institutes, if they are important enough, are all appointed with the consent of the republic or all-union central committees of the party. Presidents of Soviet academies of science cannot be "elected" or hold these jobs unless they are cleared by the Central Committee of the Communist Party of the Soviet Union. Thus party control permeates the entire Soviet system; for any job of responsibility a person needs party clearance. This system represents the main pillar of the dictatorship of the Communist Party. A communist dictator,

[85] Discussion of some of the problems involved in the nomenclature system may be found in many articles. For example, see the pamphlet by P. D. Morozov, *Leninskie printsipy podbora, rasstanovki i vospitaniia kadrov* (Leninist Principles of Selection, Placement and Training of Cadres), Moscow, 1959.

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be he Stalin, Khrushchev or anyone else, selects the officials of the party's office on cadres of personnel, which in turn, through the nomenclature, controls all the jobs of importance throughout the entire country. Perhaps there is a slight qualitative change in the structure of the dictatorship as operated by Khrushchev with power being more broadly based than under Stalin. This is manifested by the trend in recent years whereby a number of nomenclature jobs controlled by the Central Committee of the CPSU or by union republic central committees have been transferred to regional auspices.[86]

One of the troubles with having party organs select appointees to fill nomenclature positions is that the party organizations rely largely upon the existing roster of available personnel. There are numerous complaints that party committees do not know the abilities or executive qualifications of the people with whom they deal; that it is common practice to select people simply on the basis of their having held executive positions before— their names having thus been entered on the list of cadre workers of the party organization from which nomenclature jobs are filled—even though the person may long since have been found completely unsuited for an executive job.[87] Inevitably, there are cases where party organizations appoint people to executive positions solely on the basis of their party standing who lack the appropriate engineering, agronomic, or veterinary education.[88]

At the 21st Party Congress, Khrushchev sponsored a resolution calling for the strengthening of recruitment, particularly among the younger generation, and for improvement in the utilization of key specialists, managers and party functionaries.[89] Echoing these demands, a *Pravda* editorial recently disclosed that fairly often executive personnel, predominantly chosen through the nomenclature procedure, are assigned to jobs arbitrarily with little consideration accorded their past experience; that sometimes industrial engineers are chosen to manage agricultural establishments, while agronomists are appointed as executives in industry. The editorial further assailed the entire nomenclature practice by saying that "the lists of executive personnel are always available, but the [names of] the real executives are missing in these rosters." [90]

In order to improve the situation, the Communist Party launched a campaign in 1959 to have positions (particularly in upper management) now held by practicals (*praktiki*) refilled by young specialists. As an alternative it was suggested that the practicals "study" in some job-related training program, in evening or extension-correspondence programs of higher educational or secondary specialized establishments.

The difficulty is that the positions of responsibility are *already* filled. The current policy, which clearly ties in with the educational reform, therefore, calls for what can be termed "minimal employment displacement." Part-time study in the evening or through extension-correspondence programs, and preferably in the field in which the person is already active, direct assignment (*komandirovka*) of "successful" practicals, distinguished workers, and technicians to courses of study, and enterprise subsidies to such students conditioned on their consent to return to work at the place of previous employment upon the completion of their training are all methods of implementing this policy.

The Employment of Soviet Professional Manpower by Branch and Industry Sector

It is now appropriate to consider the questions how Soviet graduates are employed in the economy of the U.S.S.R. and to what extent their formal training coincides with the jobs they hold.

The education a person receives—particularly on the professional and semiprofessional level—determines in some degree his (or her) career

[86] *Partiinaia zhizn'*, No. 9, 1956, p. 6.

[87] N. I. Beliaev, then First Secretary of the Central Committee of the Kazakh SSR, but purged in 1960, in *Kazakhstanskaia pravda*, Jan. 15, 1959.

[88] *Idem.*

[89] Visitors to the Soviet Union have reported that the Russian word *piatidesiatnik* (the 50-year-old) is being used in a derogatory sense in reference to a party bureaucrat who is a reliable, solid family man with a big "bay-window" and a chauffeur-driven car, proud of his prestige and status and yet wholly incompetent; a man who joined the party in the 1930's and now tries to maintain his position, usually as an executive, mainly by keeping ambitious "younger upstarts" from leadership and executive jobs.

[90] *Pravda*, Mar. 20, 1959.

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choice and occupational profile.[41] This is true in any society. In particular cases, however, the education-occupation relation is determined by additional social and political factors. Thus where social mobility is hindered by rigid class structures (as in some of the European countries), or where involuntary placement procedures (as in the Soviet Union) restrict—at least initially—the movement of specialists outside their field of original concentration, the correlation of formal training to employment is likely to be high. Where, on the other hand, interstrata movement is relatively free (as in the United States), inter-occupational mobility is usually high and the correlation of formal training to type of employment relatively low.

In order to ascertain the degree of this correlation for the U.S.S.R., it is necessary to make numerical comparisons between the stock of graduates by specialty field and their employment in the economy by branch and sector of industry. Such procedure presents certain difficulties due, primarily, to lack of sufficient information. Until 1957, when the first Soviet data in this area were released, elaborate statistical methods had to be devised in order to estimate the pattern of employment of specialists in the economy of the U.S.S.R.[42] Current Soviet statistical releases have made the task somewhat easier, though many questions remain unanswered, and much more research is needed if the pattern of utilization of specialized manpower in the U.S.S.R. is to be fully understood.

There is, furthermore, the fundamental problem of ascertaining the supply and demand relationships for specialized manpower. The preoccupation in the United States with market models[43] for estimating the demand for specialized manpower has overshadowed other efforts to approach the problem of specialized manpower resources from an objective employment and utilization point of view.[44] Aside from the fact that the market model approach tends to disregard many noneconomic factors, there is the additional difficulty that such models are not well suited to centrally planned (nonmarket) economies. In the Soviet Union, for instance, there is no open labor market; wages are determined by the political preferences of the planners, and not necessarily in accordance with short-run demand-supply relationships. Obviously, it is impossible to study the demand factors for specialized manpower in the U.S.S.R. on the basis of a market model.

As an alternative, the problem of demand for specialized manpower in the U.S.S.R. has to be approached along the same lines the Soviet planners use, i.e., from a physical allocation point of view. The questions to be asked, then, are: In what sectors of the economy are professionals employed? What is the ratio of professionals to the total number of workers employed in a given sector of the economy? By how much must employment increase in order to achieve a certain production or service goal, and what shifts in the employment ratio of professionals to the total work force can be anticipated?

In order to use such an approach, we have to be absolutely clear as to the statistical categories of reporting. According to official Soviet reporting procedures,[45] the total number of professional and semiprofessional graduates employed in the national economy includes *all* specialists possessing diploma certificates,[46] who are employed in enterprises, offices, organizations, producers' cooperatives, and collective farms, *regardless* of the functions performed or the occupational positions held. There are two statistical distributions into which specialists are grouped.

One is by training specialty, as discussed in chapter IV and chapter VI above. This is the group specialty which had been obtained by

[41] In regard to the United States, see A. A. Alchian, K. J. Arrow and W. M. Capron, *An Economic Analysis of the Market for Scientists and Engineers*, RM-2190-RC, The Rand Corp.: Santa Monica, 1958, especially p.104.

[42] N. DeWitt, *Factors of Employment and Utilization Influencing the Demand for Engineering Technical and Scientific Manpower in the U.S.S.R.*, unpubl. study, July 1957; National Science Foundation, *Potential Research on Specialized Manpower and Its Utilization in the Soviet Union*, internal report, March 1958.

[43] D. M. Blank and G. J. Stigler, *The Demand and Supply of Scientific Personnel*, New York: National Bureau of Economic Research, 1957.

[44] The only serious effort on a national level is: Wolfle, *op. cit.*, which brought the human resources studies of the 1940's to their ultimate conclusion but which, unfortunately, has not been followed up in aggregate terms.

[45] See *NarKhoz-1960*, p. 845.

[46] Those who complete higher education but do not pass the state examinations or defend a diploma project are excluded from the reported totals (and are counted as persons with partial higher or secondary specialized education—see census statistics above).

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the professional or semiprofessional at the time of graduation. For example, the category of engineers includes all persons who received an engineering diploma (i.e., specialty groups 0100 through 1400, and the 1600 group), regardless of their current occupation, position or place of employment.

The other statistical distribution groups specialists by place of current employment, a distribution which largely coincides with the reporting of workers and employees by branch and sector of the economy. In other words, the "place of employment" distribution for professionals and semiprofessionals is comparable to the "branch and industry sector" reporting for workers and employees.[47] This reporting is based on the kind of establishment, grouped together by type of activity. It includes all specialists regardless of the specialty at graduation, current position, actual occupation or functions performed within the establishment.

In earlier sections above we discussed the number of specialists employed in the national economy of the U.S.S.R. by field of former training.[48] The discussion below will deal with patterns of employment of specialists by branch and sector of the economy ("place of employment"), with an attempt to relate the former fields of training to current places of employment. Such analysis obviously cannot reveal inter-occupational mobility directly and precisely, though the matching of the two types of data offers a useful analytical exercise. Juxtaposition of this kind permits warranted inferences as to the sectors of employment of specialists in relation to their field of training.

It is not the purpose of this study to attempt a long-run projection of demand-supply relationships for professional manpower in the Soviet economy; rather by analyzing employment patterns, the factors which are important determinants of the demand for specialists will be pointed out.

[47] In manufacturing, mining and utility industries, the reporting of specialists includes intra-unit employment and those (nonmanufacturing) units which are operated on the accounts of manufacturing units; and in the construction industry, includes specialists employed in auxiliary enterprises carried on the accounts of construction enterprises.

[48] See text tables VI–24 and VI–25.

1. *Employment of Soviet Professional and Semiprofessional Specialists by Industry Sector and Branch of the National Economy*

The VI–C series of appendix tables present data on the employment of Soviet professionals and semiprofessionals for various dates.[49] Charts XXXVI and XXXVII compare the employment of professionals and semiprofessionals, respectively, by branch (place of employment) in 1941 and 1960.[50] The data indicate that there were very uneven rates of growth for professionals and semiprofessionals by places of employment in various branches of the Soviet economy.

The number of professionals employed in government and economic administration increased about 2.3-fold. In education, medicine, and industry the number of professionals employed increased about three times. More rapid rates of growth occurred in the number of professionals employed in all types of research and development outlets (about 4.5–fold), agricultural establishments (about 7–fold), and trade organizations (about 28-fold).

The number of semiprofessionals employed in education increased about 80 percent between 1941 and 1960. In government and economic administration the number doubled. Employment of semiprofessionals in medical establishments increased 3–fold, in industry 6.5-fold, in research and development 7.5-fold, in agricultural enterprises 7–fold, and in trade and distribution 20–fold.

2. *Relationship of Fields of Training to Employment by Industry Branch*

The fundamental question is whether or not any statistical correspondence exists between initial training specialties received by Soviet specialists at the time of graduation and their places (branches or sectors) of current employ-

[49] The right side of appendix tables VI–C–1–P through VI–C–5–P gives data on employment by group of establishments, sector and branch for professionals in the U.S.S.R. in 1941, 1956, 1957, in the Ukrainian SSR in 1956, and in the U.S.S.R. in 1959, respectively. Appendix tables VI–C–1–SP through VI–C–5–SP give comparable information for semiprofessionals in the same years and by identical groupings.

[50] Actual employment as of Jan. 1, 1941 and Dec. 1, 1959.

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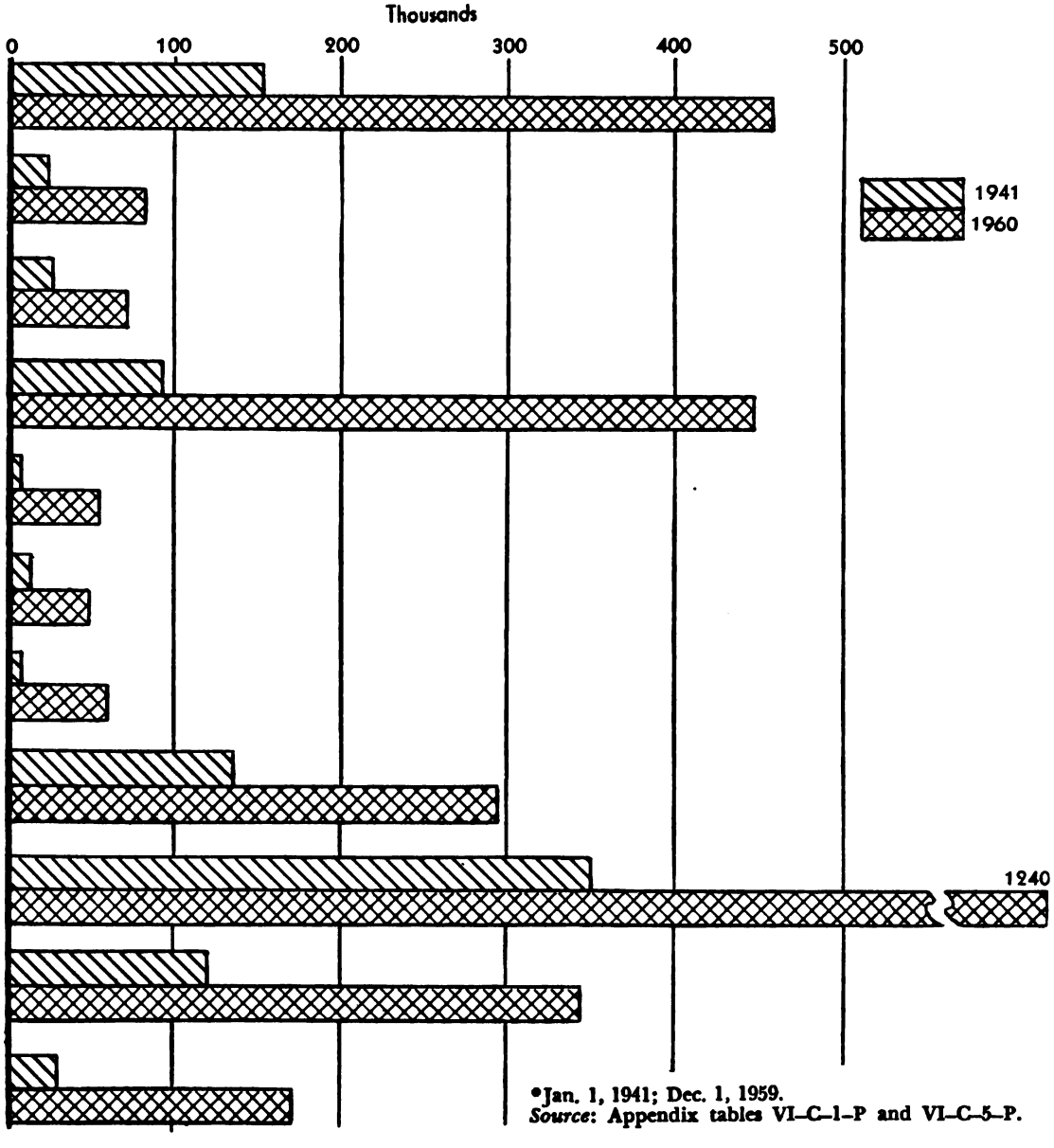
CHART XXXVI.—COMPARISON OF EMPLOYMENT OF SOVIET HIGHER EDUCATION GRADUATES BY BRANCH AS OF 1941 AND 1960*


Thousands
0
100
200
300
400
500
Industrial enterprises (manufacturing, mining and utilities; intra-unit employment only)
Construction enterprises (building and structural assembly)
Transportation and communication
Design and development institutes, bureaus, offices and administrations; research institutes; geological explorations and surveying
Collective farms and machine tractor stations
State farms and auxiliary agricultural produce processing establishments
Trade organizations; restaurants and public dining and catering services; procurement and material-technical supply organizations
Government and economic administration (ministries, central administrations, offices, bureaus, councils, etc.); cooperative, trade union and other social organizations; banking, insurance and social security
Teachers and administrators in general education schools, specialized and professional training establishments; cultural, enlightenment and recreational establishments
1240
Medical and public health institutions, sanatoria, rest homes
Other, unspecified
1941
1960

*Jan. 1, 1941; Dec. 1, 1959.
Source: Appendix tables VI–C–1–P and VI–C–5–P.

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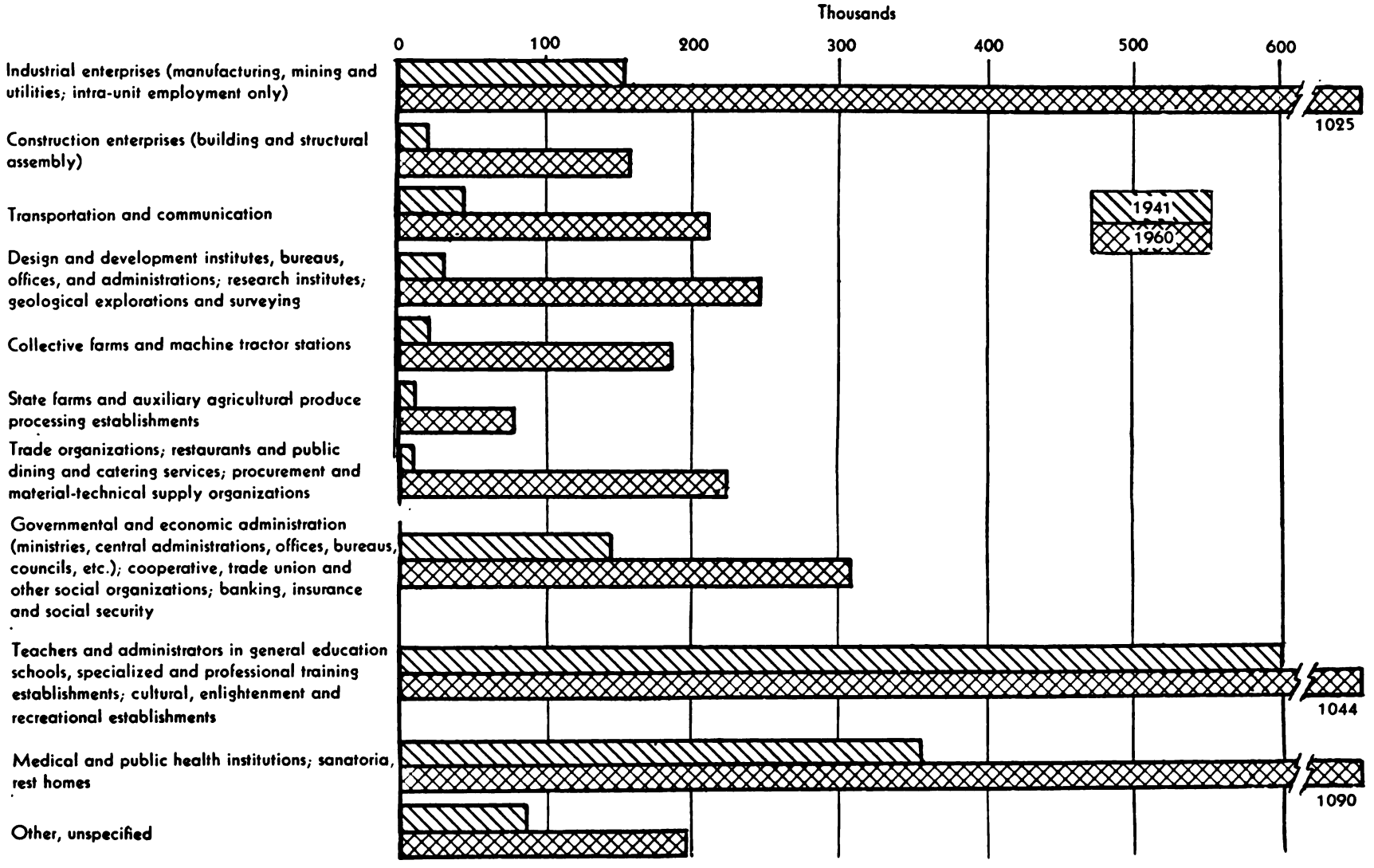
CHART XXXVII.—COMPARISON OF EMPLOYMENT OF SEMIPROFESSIONAL GRADUATES BY BRANCH AS OF 1941 AND 1960*


Thousands
0
100
200
300
400
500
600
Industrial enterprises (manufacturing, mining and utilities; intra-unit employment only)
1025
Construction enterprises (building and structural assembly)
Transportation and communication
1941
1960
Design and development institutes, bureaus, offices, and administrations; research institutes; geological explorations and surveying
Collective farms and machine tractor stations
State farms and auxiliary agricultural produce processing establishments
Trade organizations; restaurants and public dining and catering services; procurement and material-technical supply organizations
Governmental and economic administration (ministries, central administrations, offices, bureaus, councils, etc.); cooperative, trade union and other social organizations; banking, insurance and social security
Teachers and administrators in general education schools, specialized and professional training establishments; cultural, enlightenment and recreational establishments
1044
Medical and public health institutions; sanatoria, rest homes
1090
Other, unspecified

*Jan. 1, 1941; Dec. 1, 1959.
Source: Appendix tables VI–C–1–SP and VI–C–5–SP.

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ment. Save by inference, an answer cannot be given.

Ideally, we would like to know what proportion of Soviet physicians are employed as physicians in the medical establishments of the U.S.S.R., or what proportion of all Soviet engineers are employed as such in industry, construction, transportation and communication, in production, manufacturing, service, and research and development activities. Instead of such information, the Soviet authorities release data on the total number of professionals employed in a given branch of the economy—for instance, in medical establishments, schools, or industrial enterprises. It is, of course, obvious, that it is not likely that medical establishments would employ in significant numbers persons who are engineers by training, or that manufacturing plants would employ a sizeable number of physicians. It is less obvious, however, what the specializations are of professionals employed in government and economic administration. They could be, by formal field of training, engineers, agronomists, physicians, lawyers, teachers, etc. Similarly, though educational establishments must employ a large number of professionals who are teachers by training, they may also employ those with other training specialties, such as engineers, physicians, or agricultural specialists.

These examples point up the underlying difficulty in correlating the two types of data. The problem can be approached, however, in the following way. If it is assumed that specialists trained in a given field would normally be employed largely in establishments whose major activity calls for the employment of a given type of specialists, then the question arises, is there any gross correlation between the two sets of data?

The "C" series of appendix tables to chapter VI have been arranged in such a way as to try to match the two sets of data. The left side of each table gives the numbers and distribution of professionals or semiprofessionals by field of training. On the right-hand side of each table these data are matched with the reported number and distribution of specialists employed by branch and industry sectors.

What is the result of this matching? We observe that for all years the total number of professionals in all branches of production, distribution and government administration (right side, total 1–4) is closely related to the number of professionals trained for these branches according to their formal fields of study (left side, total 1–3). The divergencies between the employment figures and the training figures are insignificant. The same is true for professionals actually employed in and those trained for social service fields (education and public health). In other words, professional personnel trained for teaching and cultural service careers and medicine do not find their way into employment positions in the production, distribution and government administration segments of the Soviet economy in any appreciable numbers.

A comparison of similar information in regard to Soviet semiprofessionals reveals a close match between training and employment figures. These two sets of data reinforce our contention that between the two broad segments of employment (production-distribution-administration on the one hand, and social services on the other), transfers are statistically insignificant. This does not mean that there are no transfers whatever, but does suggest that such transfers are not at all numerous.

When, however, the particular specialized fields within the broad production-distribution-government administration employment segment are analyzed, considerable deviation between the number of specialists trained in a field and the number actually employed in the relevant types of institutions may be noticed. Thus, for example, the data for 1957 [61] show that agricultural enterprises employed 103,000 professionals, while there were 193,000 professionals trained in agricultural fields. In trade and distribution and government service (right side, G and H, total), 287,000 professionals were employed, while graduates in the hypothetically corresponding fields of training (left side, item 3) accounted for 215,000. Finally, while there were only 472,000 professionals employed in industrial, construction and transportation enterprises (right side, items A, B, C), the total number of engineering-industrial field professionals by training specialty was 816,000. However, if professionals employed in product

[61] Appendix table VI–C–3–P.

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and project design, research and development organizations [52] are added—these in the U.S.S.R. are separated administratively from manufacturing, mining and related industries—the total of professionals employed in these fields rises to 828,000 (right side, subtotal A–D), which is a figure only slightly higher than the one representing the number of professionals trained in the engineering-industrial fields (i.e., 816,000, right side, item 1).

Among the semiprofessionals in 1957,[53] a similar though less sharply pronounced pattern can be observed. Industrial and agricultural technicians and semiprofessionals trained in the socioeconomic fields have been reallocated among the various sectors of employment in such a way that in agriculture fewer semiprofessionals are employed than have been trained. In trade and distribution and government administration, on the other hand, more technicians are employed than the number trained in these fields. Again, in manufacturing, construction and transportation, fewer industrial technicians are employed than the number trained; and even if technicians employed in design, research and development are added, the total employment figure (1,215,000) is still slightly smaller than the number trained for such jobs (1,257,000).

The data for other years for the U.S.S.R. (1941, 1956 and 1959)[54] and for the Ukrainian republic [55] (this is the only Soviet republic which has released comparable data) reveal similar patterns: the number of professionals and semiprofessionals formally trained in engineering-technical, agricultural and socioeconomic specialties closely matches the number of specialists employed in the production-research-management-distribution sectors of the economy. Within sectors, however, there is some redistribution of specialists. It is thus evident that Soviet engineers and agricultural specialists are employed not only in the sectors for which they were trained but in other branches of the economy (i.e., procurement and distribution, government administration, research and development). Similarly, professionals in the socioeconomic fields (mostly economists, accountants, planning specialists) are undoubtedly employed in manufacturing enterprises, utilities, research and development and agriculture, as well as in government administration and trade and distribution organs. It is clear, therefore, that in the segment of the economy comprising manufacturing, utilities, agriculture, trade and distribution and government administration, and research and development, intersector transfers *do* take place. Engineers who are assigned initially to an industrial plant may subsequently change jobs and work in research and development organizations or in government administration, and vice-versa. Specialists trained in agriculture do not necessarily work in agriculture, but may be employed also in government administration, in research, etc.

The end result of this hypothetical matching of specialists by training and by place of employment reveals by juxtaposition that the stock of graduates trained for employment in social service fields corresponds numerically and approximately to the number of specialists employed in these fields. The stock of specialists by training in engineering, agricultural and socioeconomic fields likewise corresponds approximately with the number of specialists actually employed in the production-distribution-administration branches of the national economy. Within the latter branches, however, we cannot tell what the correspondence of employment and training fields might be without further inquiry.

3. *Comparison of the Employment of Soviet Professionals by Branch and Sector of Industry with the Pattern of Employment of U.S. College Graduates*

The number of specialists employed in the Soviet economy will now be related, by branch and industry sector, to the employment of all workers and employees. This will then be compared with the employment pattern of college graduates in the United States in relation to the total employment in the corresponding sectors of the American economy.

Figures on employment by sector of the

[52] The Soviet definition of "research" presents a difficulty here, for it includes all fields and is not limited to the physical sciences and engineering (see further discussion below and in ch. V).

[53] Appendix table VI–C–3–SP.

[54] Appendix tables VI–C–1–P and –SP, VI–C–2–P and –SP and VI–C–5–P and –SP.

[55] Appendix tables VI–C–4–P and –SP.

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economy are collected by Soviet statistical reporting agencies on a monthly basis, and are then usually converted to "average annual" reporting figures in statistical releases. For professionals with completed higher education and semiprofessionals, data by formal training specialty and by current institutional employment are also compiled regularly. However, tabulation processing by the U.S.S.R. Central Statistical Administration is done once a year on the basis of the personnel card file, usually toward the end of the calendar year.

The statistical grouping of Soviet employees by branch and sector resembles American practice. In both countries, employment figures are compiled on an establishment basis, which means that workers in a given enterprise are grouped together and the major activity of the employing units determines the sector of industry in which the units are to be grouped. While in Soviet practice the definitional designation of activity is for the most part similar to that in the United States, on the basis of major product or service rendered by a firm, the groupings of industry sectors and branches do differ somewhat from the American groupings. For instance, Soviet "industry" includes most utilities, such as electricity, gas, etc., which make up a separate group in American reporting. (See appendix VI–Q.)

Although the Soviet category of "workers and salaried employees" excludes certain groups of workers (such as some auxiliary workers in construction enterprises, temporary "hired help" for loading and unloading operations in manufacturing plants, certain categories of workers employed in producers' cooperatives, artisans, etc.), it bears by and large close resemblance to the American reporting category of "gainful employment" and "self-employment" combined.

In contrast to Soviet practice, however, American reporting does not single out specialists with professional and semiprofessional education, or leading administrative personnel (see discussion below), into separate categories of employment within branches and sectors of industry. Instead, U.S. employment reports frequently refer to occupation groups, which constitute aggregations of various occupations listed in occupational classification manuals.[86] In no instance in American practice do college graduates figure as a separate reporting category.

The only way of tracing the employment pattern of United States college graduates by industry is to use educational attainment statistics either as they are prepared during the decennial censuses of the United States population (i.e., 1940, 1950, 1960) or else, as they are estimated on the basis of biannual sample surveys (i.e., 1955, 1957, 1959, etc.). Both the censuses of population and the biannual surveys give data on the educational attainment of employed workers by occupational group. Thus in order to make meaningful comparisons by branch and industry between the Soviet and American employment of higher education graduates, the United States data must be recomputed in order to arrive at a matching estimate of the number of higher education graduates by industry sector and branch.

Such recomputations have been made on the basis of the 1950 U.S. census figures. Appendix tables VI–US–1 through VI–US–4 summarize the pertinent data. Appendix table VI–US–1 gives data on the total number of employed workers in the different industry sectors by occupation group, total and by sex. It was necessary to make the computations by sex because average educational attainment data for both sexes produced an upwardly biased estimate. Appendix table VI–US–2 offers computed ratios of college graduates (with 4 years of completed college education or additional years of training) to the total number of persons in each major occupational group, total and by sex.

The third step in the estimating procedure consists of applying the ratios of appendix table VI–US–2 to the base data on employment in appendix table VI–US–1, with the resulting estimate of college graduates in an occupational group for industry sectors. These data are presented in table VI–US–3. The data in column M of this table correspond definitionally to the Soviet reporting of higher education graduates by branch and industry sector, as shown on the

[86] Federal Security Agency, Social Security Administration, Bureau of Employment Security, *Dictionary of Occupational Titles*, vol. II: *Occupational Classification and Industry Index*, 2d ed., Washington, D.C.: U.S. Government Printing Office, 1949.

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TABLE VI–33.—*Employment of Soviet professional graduates (1956), as compared with employment of U.S. college graduates (1950), by branch and sector of industry and in relation to total employment*

Soviet Union: 1956 reporting				United States: Census, April 1950			
Branch and industry sector	Workers and employees[a] (thousands)	Profess. graduates[b] employed (thousands)	Profess. graduates per 1,000 employees (number)	College graduates per 1,000 employees (number)	College graduates[c] employed (thousands)	Gainful employment (thousands)	Branch and industry sector
I. Industrial activity and related (1, 2, 3), total.	25,122	719	29	48	1,134	23,664	I. Industrial activity and related (1, 2,3), Total.
1. Industry total.....	19,594	611	31	48	767	16,030	1. Industry total.
1a. Industrial enterprises manufacturing, mining and utilities; *intra*-unit employment).	18,500	320	17	47	683	14,453	1a. Manufacturing (durables and nondurables).
				34	32	928	1b. Mining.
				47	26	565	1c. Utilities (power and gas, excluding sanitary services).
1b. Research and development and science service.	1,094	291	266	304	26	84	1d. Professional services (engineering and architecture only).
2. Construction enterprises[d].....	3,550	54	16	42	144	3,398	2. Construction.
3. Transportation (railroad, water, air and automotive) and communications	5,840	54	9	53	233	4,236	3. Transport (and its maintenance) and communications (total).
				47	167	3,569	3a. Transportation and communication (net of utilities).
				84	56	667	3b. Business repair service (automotive only).
II. Agriculture, total.....	(44,485)	(98)	(2.2)	15	104	7,106	II. Agriculture, total
4a. Salaried workers and employees on machine tractor stations, collective farms, state farms and auxiliary agricultural enterprises	6,485	98	15	15	104	7,016	4. Agriculture, forestry and fisheries.
4b. Collective farmers (estimated.[e]	(38,000)	None	None	.....	.....	.....	
III. Trade and distribution, total.....	3,826	28	7	58	847	14,634	III. Trade and distribution, total
5. Trade and supply organizations; restaurants, public dining and catering services; repair shops; procurement and material-technical supply organizations.	3,826	28	7	65	671	10,389	5a. Wholesale and retail trade.
				84	61	729	5b. Business repair service (advertising, customer repair service).
				33	115	3,516	5c. Personal services.

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IV. Government and related services	4,403	373	85	94	524	5,599	IV. Government and related services.
6. Government and economic administration (public administration, ministries, administrations, *sovnarkhozy*, offices, bureaus, trade union and social organizations, cooperatives)	1,342	241	179	101 304	251 70	2,490 233	6. Public administration (federal, state, local). 6a. Professional services (legal only).
7. Banking, finance and insurance	266	(*)	(*)	84	158	1,883	7. Finance, insurance and real estate.
8. Municipal services and urban housing mortgage	1,503	(*)	(*)	47	10	213	8. Sanitary (municipal) services.
9. Other unspecified.....	1,292	132	102	45	35	780	9. Industry not reported.
National economy subtotal: production, distribution and administration.	43,698	1,218	28	51	2,609	50,913	National economy subtotal: production, distribution and administration.
(Including collective farmers)	(81,698)	(1,218)	(15)				
V. Social services, total.....	6,839	1,415	207	288	1,408	4,890	V. Social services, total.
10. Education and cultural services (general education schools and professional training schools; culture and recreation).	4,103	1,131	275	332 377 165	872 780 92	2,627 2,070 557	10. Education and recreation, total. 10a. Education (public and private). 10b. Entertainment and recreation services.
11. Health and medical services (medical and public health institutions; sanatoria and rest homes).	2,736	284	104	277	452	1,629	11. Health and medical services (hospitals and private services).
				133	84	634	12. Welfare, nonprofit and similar organizations.
Grand total (excluding collective farmers)	50,537	2,633	52	72	4,017	55,802	Grand total.
Grand total (including collective farmers)	(88,537)	(2,633)	(30)				

* Included in "Other unspecified."

See Sources and notes on p. 476.

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right-hand side of appendix tables VI–C–1–P through VI–C–5–P.

A further, but relatively minor, complication arises as a result of the somewhat divergent American and Soviet methods of industry classification. However, this can be easily remedied by a careful matching of the United States data with Soviet employment categories.

Data for 1956 on the employment of Soviet workers and employees by branch and sector of industry and on the corresponding employment of Soviet higher education graduates in these sectors are presented on the left side of table VI–33. The right side of table VI–33 presents United States data for 1950 on the total number of persons gainfully employed and the estimated number of employed college graduates by branch and sector of industry. The United States branch and industrial sector categories are closely matched to Soviet definitions and corresponding industry groupings.

In order to present a full picture of the U.S.S.R. side, collective farm employment (in conventional man-hour years) has been added in parentheses under the agricultural total and the grand total (including collective farmers). This addition does not affect any other figure, nor does it affect Soviet professional graduates, for even those professionals who work on collective farms (i.e., all agricultural specialists, some teachers and medical doctors) are *already* counted as workers and employees. It is to be noted again that the comparison is between U.S.S.R. data for 1956 and United States data as of 1950; since 1950, 12 million persons have been added to the total of gainfully employed persons in the United States, among them 1.7 million college graduates.

Finally, in the two center columns, table VI–33 gives the computed ratios of professionals per 1,000 employees in the U.S.S.R. and of college graduates per 1,000 employees in the United States. It is surprising to find that despite the Soviet emphasis on production activities and industrial-applied training, total employment in the social services (education and public health) was larger in the U.S.S.R. than in the United States. Perhaps this is a reflection of the employment of professionals responsive to the size of the population and thus should be further weighted by the size of the total population which derives educational and medical services. Yet, striking also is the finding that the number of professional graduates em-

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Sources and Notes to Table VI–33

U.S.S.R. Employment: *Dos–1957*, p. 251; *NarKhoz–1959*, pp. 648, 658–59. Estimate of collective farmers is based on opening the percentage distribution table in *NarKhoz–1959*, p. 655. See also U.S. Congress, Joint Economic Committee, *Comparisons of the United States and Soviet Economies*, Part I, 86th Cong., 1st sess., Washington, D.C.: U.S. Government Printing Office, 1959, pp. 73–92.

U.S.S.R. Higher Education Graduates: Appendix table VI–C–2–P (*Dos–1957*, pp. 258–60).

U.S. Employment: U.S. Department of Commerce, Bureau of the Census, *United States Census of Population: 1950*, Special Report P–E No. 1C, *Occupation by Industry*, Washington, D.C.: U.S. Government Printing Office, 1954; U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States: 1955*, Washington, D.C.: U.S. Government Printing Office, 1955, pp. 200–208.

U.S. College Graduates: Author's estimates explained in the text, derived on the basis of U.S. population census. See estimates in appendix table VI–US–1 (Employment of Occupational Groups by Industry); VI–US–2 (Number and Computed Ratios of College Graduates in Occupational Groups); and VI–US–3 (Estimated Number of College Graduates by Industry). In addition to the published U.S. census data, special tabulations of educational attainment by occupation prepared by the National Science Foundation were used in these estimates. The author is indebted to Mr. Robert Cain and Mr. Thomas Mills for providing him with these age controlled raw data. Appendix table VI–US–4 gives data on college graduates among the total number of persons of a given occupation and computed ratios. Most of these data are being released publicly for the first time.

[a] Soviet workers and employees are reported on an average annual basis.

[b] Professional higher education graduates as of Dec. 1, 1956.

[c] U.S. college graduates include all persons with bachelor, first professional and higher degrees. The total (4,017,000) represents the number of graduates gainfully employed in the civilian labor force according to the U.S. population census of April 1950. The total number of college graduates in the labor force was 4,165,000, including the unemployed and those in the armed forces. The total population of living college graduates was 5,785,000, of whom 1,620,000 were *not* in the labor force (i.e., permanently retired or women who withdrew from employment).

[d] Among total employees, construction enterprises exclude 1,535,000 seasonal construction workers of collective farms and auxiliary construction enterprises.

[e] The number of collective farmers is variably estimated as between 35 and 44 million on a converted full man-year basis (i.e., total number of labor days earned by all collective farmers divided by the average annual number of labor days earned per farmer). During the peak of seasonal activities, the actual rural labor force exceeds this hypothetical collective farm labor force by many millions. The figure of 38,000,000 is a crude approximation only and therefore was put in parentheses in the table. It is to be noted by contrast, on the American side the total includes *all* gainfully employed persons in agriculture. Note also that specialists employed in U.S.S.R. agricultural enterprises are *all* accounted for in 4d.

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ployed in social service fields was about the same in both countries, largely because a substantially greater number of teachers with higher education were working in the U.S.S.R. than in the United States. Perhaps the availability of a large pool of teachers in the Soviet Union as well as a larger total employment in education should be viewed as an important indicator of the Soviet Union's heavy investment in human capital.

As might be expected, the ratio of employed higher education graduates to total employment (for all branches and sectors of industry combined) was substantially higher in the United States in 1950 than in the U.S.S.R. in 1956. This is the obvious result of a larger total stock of college graduates (4,017,000) employed in the United States (compared to 2,633,000 in the U.S.S.R.). In government and related public services the ratio of United States college graduates per 1,000 employees (94) was closest to the Soviet ratio in the same sector (85 higher education graduates per 1,000 employees).

In agriculture, if Soviet salaried personnel only are considered, employment in the U.S.S.R. was about the same as total agricultural employment in the United States; this, however, leaves out a large pool of Soviet agricultural labor—the collective farmers. It is also remarkable that the number of higher education graduates employed in agriculture was almost identical in the two countries. If the Soviet agricultural labor force is limited to workers and salaried employees, the ratios of professional graduates per 1,000 agricultural employees are also identical in the two countries. But when collective farmers (38 million) are included, as they should be, the U.S.S.R. ratio declines drastically to 2.2 professional graduates per 1,000 agricultural workers.

The rate of employment of higher education graduates in Soviet trade and distribution reflects the low priority assigned this activity in the U.S.S.R. Only 28,000 professionals were employed in these fields in the U.S.S.R. and the employment ratio of professionals per 1,000 employees was only 7. This is eight times less than in the United States, where the ratio was 58 per 1,000, and the total number of higher education graduates employed was a staggering 847,000. Whatever allowances are made for possible differences in defining "trade and distribution" in the two countries, the contrasts remain striking indeed. They obviously reflect the consumer-oriented economy in the United States and the relative absence of such in the Soviet Union.

In industry (manufacturing, mining and power utilities), the United States employed 741,000 (i.e., total 1a, 1b and 1c) college graduates, while in the Soviet Union only 320,000 were so employed. The ratios were 47 and 17 professionals per 1,000 workers and employees, respectively. It should be noted in this connection that Soviet employment reporting excludes extra-unit employment (see discussion below), which consists of management and various administrative services, and is included in the United States data. The U.S.S.R. data also exclude most of the industrial research and development category, since in Soviet reporting these services are grouped under separate administrative auspices (item 1b). But even if the latter are included (as they are in the United States), the U.S.S.R. ratio is still 31 professionals per 1,000 workers and employees, compared to 48 college graduates per 1,000 workers and employees in the United States.

Finally, in construction and transportation, the U.S.S.R. again employed a substantially smaller number of higher education graduates in these fields than did the United States; the ratios of professionals to all employees were also considerably lower.

It is thus possible to conclude that in terms of the total stock of employed higher education graduates, the U.S.S.R. in 1956 trailed substantially behind the United States in 1950. The fields neglected most in the Soviet Union were agriculture and trade and distribution (the traditionally low priority areas of Soviet economic activity, though recent signs indicate an upsurge in the Soviet effort to strengthen these sectors). The gap was substantially narrower in industry (including research and development) (United States graduates—767,000; U.S.S.R.—611,000). Surprisingly, perhaps, Soviet professional employment in social service fields was equal to that in the United States, though the total workforce in these fields was substantially larger in the U.S.S.R. than in the United States. Within

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social service fields, however, the Soviet Union employed a larger number of professionals in education, though a substantially smaller number in medicine than did the United States.

These data can be examined from still another point of view, namely the distribution of graduates by sector of industry. This is summarized in table VI–34.

TABLE VI–34.—*Distribution of professional graduates in the U.S.S.R. (1956) and college graduates in the U.S. (1950) by industry sector*

[In percent of total stock of graduates employed]

Industry sector	U.S.S.R.	U.S.
I. Industry and related, total (including research and development, construction, transportation)	27.2	28.2
II. Agriculture	3.7	2.6
III. Trade and distribution	1.1	21.1
IV. Government administration and related services	14.2	13.1
V. Social services, total	53.8	35.0
of which:		
Education	(43.0)	(21.7)
Public health	(10.8)	(13.3)
Total number of graduates	2,633,000	4,017,000

Source: Percentages computed from data in table VI–33.

The data in the table demonstrate that the proportions of the total stock of graduates employed respectively in industry and related sectors, in government administration and related services, and even in agriculture, were about the same in the two economies. There were striking differences, however, in trade and distribution and in the social service fields. These two branches combined employed about the same proportion of graduates in each country. In the U.S.S.R., however, the greatest concentration of professionals (53.8 percent of the total) was in the social services, while in the United States the trade and distribution sector employed over one-fifth (21.1 percent) of the total stock of graduates, with social services accounting for only 35 percent of the total. Thus in quantitative terms at least, the U.S.S.R. in 1956 could boast a more abundant supply of professionals working in social services (i.e., education and public health) than the United States in 1950. This disparity is particularly notable in the employment of higher education graduates in education (U.S.S.R.—43 percent; United States—22 percent)—a fact that certainly requires serious attention.

This striking pattern of employment of professionals is largely a reflection of the orientation of human activity in the two economies. The United States economy is consumer-oriented, and a large concentration of professional graduates (one-fifth of the total) finds employment in trade and distribution. The Soviet economy, on the other hand, is production- and social-service-oriented, and the largest concentrations of professionals are found in these sectors. Of particular note is that the proportion of professionals employed in education is twice as high in the U.S.S.R. as in the United States. This in itself would seem to be a remarkable indicator of the Soviet commitment to education, as an investment in human capital, an indicator which is perhaps more significant than enrollment and graduation figures or even the content of education programs.

4. *Soviet Professionals and Semiprofessionals by Level of Administrative Subordination of Employing Unit*

The administrative structure of Soviet industry has been altered significantly since 1957. Before that time, most of the individual economic units were subordinated to centralized all-union ministries which were in charge of the given industry or service for the U.S.S.R. as a whole. In 1957 regional economic councils *(sovnarkhozy)* were formed, and a number of enterprises, as well as coordinating functions, were transferred to the councils. Table VI–35 summarizes the new distribution of professionals by level of administrative subordination of the economic units in which they hold jobs.

As of December 1957, units under all-union jurisdiction accounted for 13.6 percent of total employment. However, 36.3 percent of all engineering graduates and 35 percent of the professionals in the socioeconomic fields were employed in economic units under all-union jurisdiction. In all other fields the proportion of graduates employed in enterprises controlled

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TABLE VI–35.—*Distribution by type of administrative subordination of Soviet workers and employees and professionals by field as of December 1, 1957*

[In thousands]

Level of jurisdiction	Average annual number of workers and employees	Professionals by field						
		All professional specialties[a]	Engineering	Agriculture	Socio-economic	Medical doctors	Educat.-cultural	Undistributed residual
	A	B	C	D	E	F	G	H
Enterprises, offices and organizations subordinate to the national all-union ministries and departments or national jurisdictions of union-republic ministries or departments	7,515.0	614.1	296.6	29.3	51.0	43.9	150.3	43.0
Enterprises, offices and organizations under councils of ministries of the 15 union republics	47,085.0	2,191.4	519.5	163.8	94.2	302.1	994.6	117.2
among which:								
Regional economic councils	20,457.0	412.3	320.6	14.8	38.0	1.5	26.1	11.3
Republic and republic-jurisdiction of union republic ministries or departments	22,728.0	1,779.1	198.9	149.0	56.2	300.6	968.5	105.9
Local councils of deputies	3,900.0							
U.S.S.R. total	54,600.0	[a]2,805.5	816.1	193.1	145.2	346.0	1,144.9	160.2

[a] Includes undistributed residual of 160,200 from column H.

Sources: Column A–G: *NarKhoz–1959*, pp. 657, 680; column H—derived as a residual.

by all-union authorities was markedly lower (less than 15 percent).

Enterprises under the jurisdiction of the regional economic councils employed 39.4 percent of the engineering professionals. In other fields, however, the regional economic councils controlled the employment of less than 10 percent of the higher education graduates. In agriculture, medicine and education, professionals were employed largely in units subordinate either to republic ministries and departments or to local control.

TABLE VI–36.—*Distribution by type of administrative subordination of Soviet workers and employees, professionals and semiprofessionals as of December 1, 1959*

Level of jurisdiction	Average annual number of workers and employees		Professionals		Semiprofessionals	
	Thousands	Percent	Thousands	Percent	Thousands	Percent
Enterprises, offices and organizations subordinate to the national all-union ministries and departments or national jurisdiction of union-republic ministries or departments	7,077.0	12.5	592.8	18.3	660.8	13.7
Enterprises, offices and organizations under councils of ministries of the 15 union republics	49,432.0	87.5	2,642.9	81.7	4,120.3	86.3
among which:						
Regional economic councils	21,442.0	37.9	539.7	16.7	1,032.2	21.6
Republic and republic-jurisdiction of union republic ministries or departments	23,747.0	42.0	2,039.7	63.2	2,965.8	62.0
Local councils of deputies	4,243.0	7.6	63.5	1.8	122.3	2.7
U.S.S.R. total	56,509.0	100.0	3,235.7	100.0	4,781.1	100.0

Source: *NarKhoz–1960*, pp. 587, 612.

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Table VI–36 presents data for December 1959 on the employment of workers and salaried employees, professionals and semiprofessionals by level of jurisdiction. At the end of 1959 18 percent of the total number of professionals and 17 percent of semiprofessionals were employed in units under the control of central ministries, which is about the same proportion as in 1957. Furthermore, while the regional economic councils accounted for 38 percent of all workers and salaried employees, they accounted for only 17 and 22 percent, respectively, of professionals and semiprofessionals. Although 1959 data on the employment of graduates by field by different levels of economic subordination are not available, it may reasonably be assumed that the proportion of engineers employed under all-union jurisdictions continued to be high, while the employment of education and medical field professionals was concentrated in units subordinate to union-republic and local jurisdictions.

5. *Regional Pattern of Employment of Soviet Specialists*

Table VI–37 presents data on the relative share of the Russian SFSR in the employment of graduates by specialty field. These data are important, for they demonstrate that while in all professional fields combined the Russian SFSR accounts for a share of graduates not signifi-

TABLE VI–37.—*Share of the Russian SFSR in the employment of the U.S.S.R.'s professionals by branch, December 1957*

Specialty branch	U.S.S.R. total Thousands	RSFSR	
		Thousands	Percent
1. Engineering-industrial	816.1	559.1	68.5
2. Agronomy	193.1	102.9	53.3
3. (a) Economics-statistics	145.2	96.9	61.5
(b) Merchandising	12.3		
(c) Jurisprudence	57.8	34.2	59.1
4. Educational-cultural	1,144.9	620.3	54.2
5. Health	346.0	202.8	58.6
Total	2,715.4	1,616.2	59.6
Unexplained residual	90.1	48.0	53.4
Official grand total	2,805.5	1,664.0	59.3

Source: *NarKhoz–1959*, p. 674; *NarKhoz RSFSR–1959*, pp. 377, 386.

TABLE VI–38.—*Number and distribution of Soviet population, employment, semiprofessional and professional manpower, and research and academic personnel, by union republic, late 1950's*

Union republic	Population Jan. 15, 1959		Average annual employment, 1958		Total employment in education and cultural services 1957		Total employment in research and science services 1957		Semiprofessionals Dec. 1, 1957		Professionals Dec. 1, 1957		Research and academic personnel October 1, 1958		Candidate degree holders Oct. 1, 1958		Doctor degree holders Oct. 1, 1958	
	Millions	Percent	Millions	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Units	Percent	Units	Percent
Russian	117.5	56.3	35.1	64.3	2,459	57.8	899	74.7	2,505.7	62.4	1,664.2	59.3	194.8	68.6	62,041	68.9	7,546	73.4
Ukrainian	41.9	20.0	9.3	17.0	789	18.6	108	9.0	729.5	18.1	534.6	19.0	36.6	13.0	12,359	13.8	1,189	11.6
Belorussian	8.1	3.9	1.5	2.7	161	3.8	14	1.1	131.4	3.3	83.5	3.1	5.5	1.9	1,712	1.9	149	1.4
Uzbek	9.3	3.9	1.4	2.6	152	3.6	26	2.1	98.7	2.4	83.2	3.1	8.3	2.9	2,203	2.4	194	1.9
Kazakh	9.3	4.4	2.6	4.8	177	4.2	66	5.5	159.4	4.0	95.9	3.4	7.8	2.7	1,959	2.2	160	1.6
Georgian	4.0	1.9	.8	1.5	106	2.5	18	1.5	70.0	1.7	91.5	3.3	7.5	2.6	2,983	3.4	403	3.9
Azerbaidzhan	3.7	1.8	.7	1.3	77	1.8	15	1.2	62.2	1.6	58.8	2.1	5.6	2.0	1,748	1.9	174	1.7
Lithuanian	2.7	1.3	.6	1.0	56	1.3	6	.5	39.5	1.0	27.6	1.0	2.5	.9	547	.6	27	.3
Moldavian	2.9	1.4	.6	1.7	45	1.2	4	.3	35.3	.9	23.5	.8	1.6	.6	467	.5	51	.5
Latvian	2.1	1.0	.4	1.0	40	1.0	8	.6	43.9	1.1	32.2	1.1	3.1	1.1	828	.9	67	.6
Kirgiz	2.1	1.0	.4	.7	40	.9	13	1.1	31.6	.8	21.9	.8	2.0	.7	511	.6	44	.4
Tadzhik	2.0	1.0	.3	.5	39	.9	10	.8	26.6	.7	17.7	.6	1.8	.6	398	.4	28	.3
Armenian	1.8	.8	.4	.7	42	1.0	9	.7	28.7	.7	32.5	1.1	3.3	1.2	1,354	1.5	153	1.5
Turkmen	1.5	.7	.3	.5	30	.7	8	.6	25.4	.6	17.2	.6	1.5	.5	345	.4	30	.3
Estonian	1.2	.6	.4	.7	28	.7	4	.3	28.2	.7	19.2	.7	2.0	.7	525	.6	67	.6
U.S.S.R., total	208.8	100.0	54.6	100.0	4,250	100.0	1,208	100.0	4,016.1	100.0	2,805.5	100.0	284.0	100.0	89,960	100.0	10,282	100.0

Source: *NarKhoz–1959*, pp. 8, 661–63, 677, 679, 847.

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cantly different from its share in the U.S.S.R.'s total population (56 percent), it shows on its territory a marked concentration (68.5 percent) of the Soviet engineering graduates.

Table VI–38 presents information on the number and computed distribution of the Soviet population, total employment, employment in education, in industrial research and development (i.e., research and science service), of semiprofessionals, professionals, and research and academic personnel. The Russian SFSR accounts for three-fourths of the total employment in research and science service, and for about the same proportion of all advanced degree holders. The Ukrainian SSR and the Russian SFSR together account for over 75 percent of the U.S.S.R.'s total population, but they employ from 80 to 85 percent of all Soviet specialists, researchers, etc. The Russian SFSR alone accounts for a larger share in each category than its weight in the U.S.S.R.'s total population. Employment and research and professional services are thus highly concentrated in the Russian SFSR (primarily in its European part and the Urals) and the Ukrainian SSR. All other republics combined account for only 15 to 20 percent of Soviet nonagricultural employment and about the same proportion of all types of professional, research, and academic personnel.

The Soviet Intelligentsia and Professional and Semiprofessional Personnel

Graduates of Soviet secondary specialized schools and of institutions of higher learning represent in their professional life the managers and administrators, the white-collar workers, the technical and supervisory personnel, the lawyers, the doctors, the scientists, the teachers and artists of the U.S.S.R. This large group is usually referred to in Soviet pronouncements as the "intelligentsia."

The Marxist dictum that, no matter how it is recruited or in which society it exists, the intelligentsia is *not* a class[57] has not constrained Soviet ideologists from Lenin to Khrushchev from professing reverence for the "new Soviet intelligentsia" as a "stratum" in socialist society. Thus in 1939 Stalin proudly declared that "the most significant consequence of the cultural revolution which has taken place in our country is the rise of the new socialist people's intelligentsia."[58] Ever since, the Soviet intelligentsia has been acclaimed as a moving force in the construction of socialism and communism in the U.S.S.R.[59]

In the two decades since Stalin's statement, the "new Soviet intelligentsia" has almost doubled in size. By 1956 close to 16 million employed persons were counted in this group[60] —approximately one-fifth of all Soviet workers and employees (exclusive of collective farm labor). In 1956, then, the "new Soviet intelligentsia" comprised almost 8 percent of the total Soviet population, as compared with less than 2 percent on the eve of industrialization in 1926. In the course of the last three decades this group has grown at a more rapid rate than the total population and total labor force, and even surpassed by a sizeable margin the rate of growth of the number of industrial employees.

Just who the members of the Soviet intelligentsia are and exactly what they do are questions that still need much exploring. The term "Soviet intelligentsia" itself is an elastic one. In Soviet terminology it is used to describe that group of society which by virtue of its education or appointive position is engaged primarily in managerial and supervisory activity, in professional service, or in white-collar office occupations. As shown in table VI–39, the Soviet intelligentsia consists of administrators, managers and supervisors, government bureaucrats and party functionaries, academicians and scientists, professionals and technicians, teachers and medical doctors, some white-collar employees, military officers, and even university students.

The question immediately arises as to whether this amorphous group should be called "intelligentsia" or "power elite" or something else.

[57] "The intelligentsia does not comprise a class, for it does not occupy any particular place in the mode of social production. The intelligentsia with its knowledge and its labor serves the basic classes of society." *SSSR—kak on est'* (The U.S.S.R.—As It Is), Moscow, 1959, p. 51.

[58] J. Stalin, *Problems of Leninism*, Moscow, 1941, p. 644 (speech at the 18th Congress of the CPSU).

[59] M. Protsko, *Sovetskaia intelligentsiia v bor'be za kommunizm* (The Soviet Intelligentsia in the Struggle for Communism), Moscow, 1950. There are literally hundreds of articles in the communist press glorifying the role of the Soviet intelligentsia.

[60] *Dos—1957*, p. 255.

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TABLE VI–39.—*Occupational composition of the Soviet intelligentsia, 1926, 1937, 1956*

[In thousands]

Occupational groups	1926	1937	1956
Administrative, managerial and supervisory personnel	365	1,751	2,240
Engineering-technical personnel in industry, construction and transportation	225	1,060	2,570
Agricultural specialists and technicians	45	176	376
Research and academic personnel in higher education and research establishments	14	80	231
Teachers, supervisors and school administrators on all levels below higher education	381	969	2,080
Cultural service, entertainment and arts personnel	90	456	572
Medical doctors	57	132	329
Intermediate medical and health service personnel	128	382	1,047
Economic planning and accounting personnel	650	2,439	2,161
Legal and jurisprudence personnel	27	46	67
Students of higher educational establishments	168	550	1,178
Other groups, including military personnel and party functionaries	575	1,550	2,609
Grand total	2,725	9,591	15,460
Among whom with completed higher education	233	749	2,633
With completed secondary specialized education	288	1,440	3,624
Total with specialized education	521	2,189	6,257
Percent of grand total with specialized education	19.0	23.0	41.0

Sources: *Dos–1957*, pp. 255, 257; *SPM*, p. 246; *NarKhoz–1959*, p. 672; *Bol'shevik*, No. 10, 1940, p. 22.

Indeed, the notion of the intelligentsia, as a highly select, tightly knit and highly intellectual group as it existed in Russia during the last century and the first decade of this one, is now almost entirely lost. The members of the hodgepodge which Soviet official sources today call the "new Soviet intelligentsia" have the common distinction of earning their living by not dirtying their hands, by having some sort of responsibility for, or authority over, others, and —what is particularly significant—by having a good deal of education behind them.

For the last 30 years, and particularly since the late 1930's a formal education was the most straightforward avenue for entering the rapidly expanding ranks of the Soviet intelligentsia. In those 30 years, while the Soviet intelligentsia grew some 5½-fold, the number of specialists in its ranks increased better than 12-fold. In 1926 out of the total 2.7 million persons in this group, only about half a million, or 19 percent, had secondary specialized or professional higher education. During the period 1926–37 the expansion of the Soviet intelligentsia and additions of trained specialists proceeded at about the same rate, specialists comprising only about 23 percent of the group in 1937. During the 20-year period 1937–56 two-thirds of the increment in Soviet intelligentsia is accounted for by the inflow of trained specialists. In 1956, among the 15.5 million in the ranks of the Soviet intelligentsia, about 6.3 million, or about 41 percent, were trained specialists with professional or semiprofessional education. We do not have sufficiently firm statistics on the number of persons, ranked among the Soviet intelligentsia, with secondary nonspecialized education, but it probably would account for another 6 to 7 million. Thus it can be shown that the average educational attainment of the Soviet intelligentsia taken as a group is probably more than three times higher than that of the Soviet population at large.

To be sure, the component of the intelligentsia which Soviet authorities still refer to as practicals (*praktiki*, i.e., persons who do not have higher or secondary specialized education) has not been displaced by educated specialists, but it has been considerably diminished (from 82 percent in 1926 to 59 percent in 1956). While in the early 1930's a man with little formal education could become a plant director, providing he had good party standing and a proletarian background, today managers of important plants are usually required to have an engineering education. The same is true for school directors, hospital supervisors, etc.; they too must have specialized education. Obviously these are the ideal job requirements, but in practice there are still many instances where neither plant nor school directors nor high-level managers have higher education.

When the Soviet Government released occupational statistics on the Soviet population based on the 1959 census, the new statistical category called "workers of mental labor" comprised

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TABLE VI–40.—*Level of educational attainment of the gainfully employed segment of the Soviet population, 1959 census*

	Number (millions)	Level of educational attainment per 1,000 persons		
		Total with 7 or more years of education of any type	Completed higher, partial higher or secondary specialized education	With 7 to 10 years of general nonspecialized education
Total gainful employment.....	•99.1	433	109	324
Employees performing physical labor...	78.6	316	14	302
Employees performing mental labor....	20.5	884	476	408

• Out of a total population of 208.8 million.

Source: *Vestnik statistiki*, No. 12, December 1960, pp. 7, 12.

20,495,000 persons as of January 1959.[61] The occupational composition of this category closely resembles that of "Soviet intelligentsia" in earlier reporting. The remaining 78.6 million of the total work force of gainfully employed persons (99.1 million) were classified as consisting of persons engaged in physical labor.

The Soviet census figures also gave pertinent information on the level of educational attainment of the gainfully employed population, which is presented in table VI–40.

Although the claim is made that these statistics indicate that the Soviet Union is close to "eliminating the differences between mental and physical labor"—one of the cardinal theses of communism—even a glance at the figures would soon dispel such a claim. The majority of professionals and semiprofessionals in the Soviet Union are employed almost exclusively in "mental labor" (i.e., 476 persons per 1,000 or 9.1 million), while relatively few trained specialists (i.e., 14 per 1,000, or about 1.1 million) are employed in physical labor.

The Soviet 1959 census report gives a listing of persons in various "mental labor" occupations, together with the number so employed in 1939 and 1959. It also indicates the ratio of persons employed in these various occupations with 7 or more years of education per 1,000 persons. These data are summarized in table VI–40A.

The data indicate that there were various rates of growth in the different occupations. For example, the number of engineering-technical personnel increased 2.5-fold, agricultural personnel, 1.6-fold, teaching personnel, 1.8-fold, medical personnel, 1.4-fold, and jurisprudence personnel, 1.2-fold. With few exceptions, the ratio of persons with 7 or more years of education among the respective occupational categories ranged between 850 and 950 per 1,000, the ratio being slightly higher for medical and public health employees; teachers, instructors and research employees; cultural-service employees; jurisprudence personnel; and economists, planners and statisticians. It was way below this for one group—employees of communal enterprises and personal services. Unfortunately, the number of persons with higher education in each group was not given.

The same statistical release[62] compares the number of "specialists" by occupation, with or without formal specialized education, for 1926 and 1959, as follows:

	1926	*1959*	*Factor of growth*
Heads of enterprises, construction units, administrations, offices and their subdivisions	365,000	2,223,000	6
Engineers, technicians and agronomy specialists	267,000	4,683,000	18
Teachers and cultural service personnel	486,000	3,276,000	7
Physicians and medical personnel	199,000	1,702,000	8.5
Research workers and academic personnel	14,000	316,000	23
Accounted total	1,431,000	12,200,000	8.5

[61] *Vestnik statistiki*, No. 12, Dec. 1960, p. 7. Other statistics are on pp. 5–21.

[62] *Vestnik statistiki*, No. 12, December 1960, p. 15.

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TABLE VI–40A.—*Listing of "mental labor" occupations in the U.S.S.R., the number employed therein, and the ratio of persons with 7 or more years of education so employed per 1,000 persons, 1939 and 1959*

Occupations	1939		1959	
	Thousands	Persons with 7 or more years of education, per 1,000	Thousands	Persons with 7 or more years of education, per 1,000
Grand total of persons in "mental labor" occupations	[a]11,796.8	498	[b]20,495.0	884
1. Heads of organs of governmental administration, social organizations and their subdivisions	445.2	359	392.1	908
2. Heads of economic enterprises and their subdivisions	757.0	285	955.2	853
of whom: chairmen of collective farms and their deputies	278.8	23	102.8	704
3. Engineering-technical personnel	1,656.5	630	4,205.9	910
of whom:				
Engineers (except those in 1 and 2 above)	247.3	.....	834.3	.....
Designers and draftsmen	103.9	.....	297.1	.....
Foremen	287.8	.....	753.5	.....
Technicians	274.0	.....	513.2	.....
Laboratory aides	156.5	.....	436.2	.....
4. Agronomists, veterinarians, animal breeding specialists, foresters	294.9	622	472.2	936
of whom:				
Agronomists and breeding specialists	176.8	.....	278.5	.....
Veterinary physicians	20.0	.....	44.9	.....
Veterinary technicians and aides	79.6	.....	109.8	.....
Foresters and land conservationists	18.5	.....	44.0	.....
5. Medical and public health employees	679.0	674	1,702.5	969
of whom:				
Chief physicians and heads of public health establishments	16.5	.....	44.0	.....
Physicians	122.3	.....	337.9	.....
Dentists	14.0	.....	31.7	.....
Physicians' aides, nurses and midwives	332.4	.....	1,058.2	.....
6. Teachers, instructors and research employees	1,553.1	892	2,835.6	991
of whom:				
Research workers and teachers in higher education	111.6	.....	316.4	.....
Heads of educational establishments (except of elementary schools)	73.1	.....	114.9	.....
Teachers of elementary and secondary schools and equivalent training establishments (including heads of elementary schools)	1,206.4	.....	2,022.8	.....
Physical education instructors and sports coaches	28.2	.....	106.6	.....
7. Employees in literature and the press	58.0	.....	104.1	.....
8. Cultural-service employees	285.0	594	462.3	958
of whom: librarians and library heads	87.2	.....	239.0	.....
9. Employees of performing and fine arts	143.3	644	190.6	894
10. Jurisprudence personnel	62.4	684	78.7	987
of whom: judges and prosecutors	20.2	.....	23.0	.....
11. Communication employees	265.4	368	476.4	792
of whom:				
Radio and telegraph operators	15.9	.....	60.5	.....
Telegraph operators	54.2	.....	71.2	.....
Telephone operators	105.3	.....	175.3	.....
12. Trade, public catering, distribution and supply employees	1,626.1	182	2,268.2	737
of whom:				
Directors of stores and trade outlets	244.9	.....	331.8	.....
Salesmen and heads of subdivisions in trade outlets	715.0	.....	1,166.3	.....
13. Planning specialists, accounting and cashier employees	3,102.0	515	3,501.9	900
of whom:				
Economists, planners, statisticians	282.1	780	308.3	979
Accountants and bookkeepers	1,785.4	535	1,816.9	927
Cashiers	279.3	.....	413.5	.....
Inspectors, comptrollers, and other accounts personnel	755.2	.....	963.2	.....
14. Other office personnel	489.4	624	535.9	943
15. Employees of communal enterprises and personal services	202.5	197	277.1	561
16. Agents and expeditors	176.4	.....	146.0	.....

[a] Official grand total not given. The figure is the sum of subcategories, where they are given, or of main categories 1–16.

[b] The official grand total (20,495,000) is larger than the sum of the subcategories, where they are given, or of main categories 1-16 (19,604,700) by about 890,000. No explanation of the discrepancy is given, but it is probable that the difference includes military officers and other categories.

Source: *Vestnik statistiki*, No. 12, Dec. 1960, pp. 3–21.

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If we assume that the number of "specialists" includes all professionals (3,027,000) and semiprofessionals (4,449,000) employed in the national economy in 1959, then 24.8 percent of the accounted total were professionals, 36.5 percent semiprofessionals, and the remaining 38.7 percent (5,724,000) were practicals without formal specialized education.

With membership in the "Soviet intelligentsia" or "workers of mental labor" come rewards and prestige. These usually go hand in hand, except perhaps in occupations which because of their humanitarian purpose command high popular esteem, but only modest financial rewards. Such occupations include medicine, nursing, nursery school and primary school teaching, and a few other professions which are dominated by women. The Soviet intelligentsia also includes some personnel in such white-collar occupations as bookkeeping, accounting, clerical work, etc., who earn relatively modest wages. But regardless of what members of the "Soviet intelligentsia" do or earn, the amount and type of education they have had, or their social, national and family background, they all have one thing in common: they are better off than the rest of Soviet society.

Leading Administrative, Managerial and Specialized Personnel in the Soviet Labor Force of Workers and Salaried Employees

One of the constituent segments of the "Soviet intelligentsia" is a group called in Soviet reporting "leading personnel and specialists" (*rukovodiashchie rabotniki i spetsialisty*). Most of the persons thus designated are considered important enough to have their names listed in a special personnel file kept by the Soviet Government. As of January 1957,[63] about 9.4 million persons were listed in this category.[64] Soviet "leading personnel and specialists" thus constituted about 61 percent of the Soviet "intelligentsia" (15,460,000). Even if allowances are made for the omission from this category of leading personnel of the military and party apparatus (which together may account for up to 1 million persons), it is obvious that the "Soviet intelligentsia" as a group is considerably inflated (by about 5 million) by white-collar employees, students, etc.

Although Soviet leaders frequently boast about the growth of the "intelligentsia" and leading personnel, their attitude towards this extensive bureaucracy is somewhat ambivalent. Criticisms of its size and denunciations of its functions are as frequent in the Soviet press as praise.

The evils of bureaucratic practices in the management of the Soviet economy have been assailed since the beginning of Soviet planning, and particularly since Stalin's death. The essence of the criticisms is that despite large staffs of managers and administrators (with every third or fourth man a head of an office, bureau or unit), no single man wants to make a decision and everyone operates on the principle of "passing the buck" to higher-ups. In 1954 a government decree, entitled "Concerning Serious Deficiencies in the Work of Party and State Apparatus," described the situation as follows: "The heads of ministries, administrations and local

[63] Actually the special census of leading personnel and specialists was taken on Dec. 1, 1956. It is known that the Soviet authorities periodically process personnel card file information on, and take special censuses of, leading personnel and specialists. See *SPM, passim*. References to the card files are found also in a number of Soviet sources, i.e., TsSU Gosplana SSSR, *Slovar'-spravochnik po sotsial'no-ekonomicheskoi statistike* (Dictionary-Handbook of Socioeconomic Statistics), 2d ed., Moscow, 1948, p. 391. Sufficiently comprehensive information was released in 1956 for the first time since 1933 (*Sots Stroi—1935*, pp. 522–35). As of November 1933, excluding secondary school teachers and medical personnel, there were 816,364 leading personnel in the U.S.S.R. Among these were 200,078 professionals with completed higher education (23.2 percent) and 168,867 semiprofessionals with completed secondary specialized education (19.6 percent), so that practicals represented the largest share (57.2 percent) of leading personnel.

[64] The statistical handbook, *RSFSR za sorok let* (The Russian SFSR during 40 Years), Moscow, 1958, p. 112, was the first Soviet source to release a tabulation of such personnel (for the RSFSR) for a postwar year. The RSFSR's total was 5,553,000; using this figure as a base, we can put the U.S.S.R's total at about 9 million. The accuracy of this estimate was corroborated in a speech to the Trade Union of Education and Research Workers in May 1958 (*Uchitel'skaia gazeta*, May 16, 1958) by Eliutin, who stated that there were 9.4 million persons in this category. Not until March 1960, when the Soviet statistical compilation (*Zhenshchina v SSSR*, Moscow, 1960) was published, were we able to obtain rather detailed information about this most important component of Soviet manpower. On the basis of this report (which deals with women in such positions), totals were reconstructed as they appear now in the various tables in this chapter. Some of the RSFSR data were used for checking purposes. Finally, the data on the employment of professional and semiprofessional personnel (from appendix tables VI–2–C–P and VI–2–C–SP) were correlated with the data for leading personnel.

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organs of administration do not use the powers with which they are invested, and under any pretext turn to higher organs, relieving themselves in this way of the responsibility of conducting business duly assigned to them."[65]

The number of bureaucrats who administer and manage the Soviet economy and government is very large indeed. Table VI–41 presents data on Soviet administrative personnel in the national economy of the U.S.S.R.

TABLE VI–41.—*Number of Soviet administrative personnel and their percentage of the total number of workers and employees, 1952–59*

Date of reporting	Number of administrative personnel (thousands)	Percent of administrative personnel in total number of workers and employees
Apr. 1, 1952.....	6,232	14.6
Jan. 1, 1954.....	6,213	14.0
Jan. 1, 1955.....	5,807	12.4
Sept. 1, 1958.....	5,696	10.2
Sept. 1, 1959.....	5,645	9.7

Source: *NarKhoz–1960*, p. 595.

This group of Soviet bureaucracy consists of managerial and supervisory personnel in enterprises and their subdivisions not directly engaged in production, technological functions, or design and development, as well as administrative and managerial personnel outside of enterprises in all types of governmental apparatus.

On the eve of Stalin's death, 1 out of every 7 Soviet workers and employees was administering or managing something or someone. During Khrushchev's administration, the managerial apparatus declined in size by some 600,000 persons, and the proportion of managerial elite was reduced to 1 out of every 10 workers and employees, largely because of the expansion of total employment. The professed intention of the 1957 reorganization of Soviet industry and the establishment of *sovnarkhozy* (regional economic councils) was to cut down on the size of the bureaucratic apparatus and to streamline its functions. The apparent result was a cut of only about 150,000 administrative jobs.

[65] *Direktivy-SBX*, vol. IV, p. 155.

There is yet another problem associated with the growth of and the present size of the Soviet administrative bureaucracy. Soviet authorities, in advocating educational reform and encouraging the program of part-time instruction in higher and secondary specialized education, seem to be following the principle of minimal displacement. Obviously, if the size of the bureaucracy is to be held down, this policy makes sense. But while the size may be held down, internal migration and replacement must go on. This is to be handled by sending those who are already in the ranks of the Soviet technical intelligentsia on to further study, which, while resulting in the upgrading of the qualifications of the bureaucracy, would pace its numerical expansion at a slower rate.

To sum up, at the end of 1956 the Soviet Union employed approximately 51 million workers and employees. Among these, about 9.4 million were classified as leading personnel and specialists, and of these, about 5.7 million (or some 60 percent) had administrative or managerial functions. In recent years the numerical growth of personnel with administrative and managerial functions has been slowed down, though the ranks of the bureaucracy have been replenished by substituting trained specialists for personnel without specialized education. This trend will probably continue.

1. *Composition of Soviet Leading Personnel and Specialists*

The Soviet category of employees called "leading administrative, managerial and specialized personnel" includes (1) persons who have completed higher education and are professionals employed in the economy, (2) persons who have completed secondary specialized education and are employed in supporting technical positions, and (3) practicals, i.e., persons without specialized education of these two types, but who are employed in various leading and key jobs which are classified as requiring the "highest qualifications," i.e., the completion of specialized education.[66] As of January 1957, the distribution of leading administrative, managerial and spe-

[66] This, of course, is only a theoretical definition, often repeated in Soviet sources. See Eliutin's article in *Uchitel'skaia gazeta*, May 16, 1958.

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cialized personnel employed in the Soviet economy was as follows:[67]

	Number	Percent of total
Professionals with completed higher education	2,633,000	28.1
Semiprofessionals with secondary specialized education	3,624,000	38.8
Practicals without specialized education in leadership posts	3,099,000	33.1
Total	9,356,000	100.0

As was pointed out earlier, Soviet reporting of specialists is based largely on educational criteria, while in the United States, employment reporting is usually based on occupational criteria. It now appears that on the basis of job (occupational) titles, the Soviet reporting category of leading personnel and specialists is indeed the closest counterpart of the American occupational classification in two major occupational groups: professional-technical and kindred workers; and managers, officials and proprietors (except farm). Although the Soviet category may include a small percentage of persons classified in the United States category of clerical and kindred workers, this admixture is really not significant.[68] When we say that these categories are similar in the two countries, we assume, of course, that in the U.S.S.R., "proprietor" functions are performed by "hired" managers who are appointed by the state, yet in terms of their supervisory functions engage in activities similar to those of proprietors in a market economy. As of April 1950, about 9.9 million persons were employed in the United States in the combined categories mentioned above,[69] which is roughly the same number as the total of leading administrative, managerial and specialized personnel in the U.S.S.R. as of January 1957.

[67] Based on the data in table VI–42 below. If Eliutin's figures (*Uchitel'skaia gazeta*, May 16, 1958) are used, a slightly but not significantly different picture emerges:

	Number	Percent of total
Professionals with completed higher education	2,510,000	26.7
Semiprofessionals with secondary specialized education	3,196,000	34.0
Practicals without specialized education	3,694,000	39.3
Total	9,400,000	100.0

The difference is largely in the number of semiprofessionals.

[68] The admixture becomes significant, however, when considering figures on "mental labor" employees (table VI–40A) or the Soviet intelligentsia, since these two categories include most white-collar office workers and even office service personnel.

[69] Appendix table VI–US–2.

2. *Leading Personnel and the Employment of Specialists by Industry Sector*

The reporting of leading personnel and specialists by branch and sector runs parallel to that for Soviet workers and employees and that for professionals and semiprofessionals by "place of employment" in the identical segments of the U.S.S.R.'s economy. The correlation of these three types of data—total employment, employment of leading personnel, and employment of specialists—offers significant insight into the overall pattern of utilization of specialized manpower in the U.S.S.R.

Table VI–42 summarizes information on Soviet workers and employees by branch and sector of industry (col. A), employment of leading personnel in each sector (col. B), the trained manpower component within it (cols. F, G, and J), and the ratios of leading personnel (col. C) and graduate specialists with completed higher education (col. I) per 1,000 workers and employees. The number of practicals (col. D) has been derived as a residual on the basis of the data for trained specialists (i.e., professionals and semiprofessionals) and for all leading personnel. Finally, the percentage composition of leading personnel (col. C) for practicals (col. E), professional specialists with completed higher education (col. H), and semiprofessionals (col. K) has been computed for each industry sector.

The ratios of higher education graduates per 1,000 workers and employees were discussed above (table VI–33). These ratios of professional graduates, when compared with those for all leading personnel per 1,000 employees, reveal a pattern of profound intersector differences in the rates of employment of professional personnel in the U.S.S.R. The ratios are lowest in such sectors as trade and distribution (7); agriculture (15); transportation and communication (9); construction and manufacturing (17); and highest in research and development (266); educational-cultural services (275); and medicine (104), as indicated by the data in column I.

Just as in the United States, the ranks of Soviet managerial, administrative and specialized personnel are not composed entirely of persons with formal training. About 3 million

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TABLE VI–42.–*Total employment of workers and employees; leading administrative, managerial and specialized personnel; and employment of specialists with secondary semiprofessional education and professional higher education by branch and sector of the Soviet economy as of January 1957*

Branch and sector of the economy	Total workers and employees [a]	Leading personnel [b]		Number of practicals among leading personnel (without specialized education) [c]		Number of specialists with secondary specialized or higher education [d]	Professionals with higher education [d]			Semiprofessionals [d]	
		Number	Ratio per 1,000 employees				Number	Percent among leading personnel	Per 1,000 employees	Number	Percent among leading personnel
	A	B	C	D	E	F	G	H	I	J	K
	Thousands	Thousands	Ratio	Thousands	Percent	Thousands	Thousands	Percent	Ratio	Thousands	Percent
I. Industry and related sectors	28,984	3,332	115	1,597	47.9	1,735	719	21.6	25	1,016	30.5
1. Industrial enterprises (manufacturing, mining and public utilities), intraunit employment only	18,500	1,845	98	895	48.5	950	320	17.3	17	630	34.2
2. Construction enterprises (building and structural assembly) [e]	3,550	332	93	189	56.9	143	54	16.2	15	89	26.9
3. Transportation and communication	5,840	576	99	383	66.5	193	54	9.4	9	139	24.1
a. Transportation	5,216	424	...	...	...	...	...	...	...	...	...
b. Communication	624	152	...	...	...	...	...	...	...	...	...
4. Research, design and development [f]	1,094	579	410	130	22.5	449	291	50.2	266	158	27.3
a. Research institutes	673	246	...	...	...	...	...	...	...	...	...
b. Project institutes		167	...	...	...	...	...	...	...	...	...
c. Design institutes		92	...	...	...	...	...	...	...	...	...
d. Geological surveying	379	74	...	...	...	...	...	...	...	...	...
e. Meteorological services	42	...	...	...	...	...	...	...	...	...	...
II. Agriculture (salaried employees only) [g]	6,485	567	87	207	36.5	360	98	17.3	15	262	46.2
5. Machine-tractor stations, repair-technical stations and collective farms	2,880	...	...	...	...	291	72	...	...	219	...
6. State farms and auxiliary agricultural processing establishments	3,215	...	...	...	...	69	26	...	...	43	...
7. Forestry service [h]	390	...	...	...	...	...	...	...	...	...	...
III. Trade and distribution (trade organizations, procurement and material-technical supply organizations, restaurants, public dining and catering services)	3,826	574	150	452	78.7	122	28	4.9	7	94	16.4
IV. Government administration, economic management and planning organs	4,403	1,141	259	344	30.1	797	373	32.7	85	424	37.2
8. Government administration, economic management and planning organs	1,342	...	...	...	...	478	241	...	179	237	...
9. Banking, credit and insurance	266	...	...	...	...	...	...	...	...	...	...
10. Urban housing management and municipal services	1,503	...	...	...	...	...	...	...	...	...	...
11. Other, unspecified	1,292	...	...	...	...	...	...	...	...	...	...
12. Residual	None	1,141	...	344	...	319	132	...	...	187	...
Total: National economy, production, distribution and management	43,698	5,614	128	2,600	46.3	3,014	1,218	21.7	28	1,796	32.0

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V. Educational-cultural services.....	4,103	2,510	612	419	16.7	2,091	1,131	45.0	275	960	38.3
13. General education schools and preschools.....	.....	1,839	.....	.....	.....	.....	.....	.....	.....	.....	.....
14. Professional and semiprofessional training establishments.....	.....	392	.....	.....	.....	.....	.....	.....	.....	.....	.....
15. Cultural services.....	.....	214	.....	.....	.....	.....	.....	.....	.....	.....	.....
16. Editorial offices in publishing[i]	.....	38	.....	.....	.....	.....	.....	.....	.....	.....	.....
17. Arts and entertainment.....	.....	27	.....	.....	.....	.....	.....	.....	.....	.....	.....
VI. Public health (medical and public health institutions, sanatoria, rest homes, etc.).....	2,736	1,232	450	80	6.5	1,152	284	23.0	104	868	70.5
Total: Social services.....	6,839	3,742	547	499	13.4	3,243	1,415	37.8	207	1,828	48.8
Grand total.....	50,537	9,356	185	3,099	33.1	6,257	2,633	28.1	52	3,624	38.8

Sources and Notes

[a] Refers to the Soviet concept of wage earners as workers and employees, average annual figures for 1956. *NarKhoz—1959*, pp. 658-59.

[b] Leading administrative, managerial and specialized personnel employed in the national economy of the U.S.S.R. as of January 1957. Derived from data in *Zhenshchina*, p. 46.

[c] Category of "practicals" (*praktiki*) derived as a difference between Cols. B and F.

[d] Appendix tables VI–C–2–P and VI–C–2–SP; *Dos—1957*, pp. 259–60. Actual employment of professionals and semiprofessionals by sector as of Dec. 1, 1956.

[e] Excludes employment in subsidiary construction services on construction sites, which in 1956 accounted for an additional employment of 1,645,000.

[f] Since 1958 Soviet authorities have begun to single this category out under the common designation "research service" (*nauka i nauchnoe obsluzhivanie*). Prior to that time this category was aggregated under "educational-cultural services." In *NarKhoz—1959*, employment in this category is given also for years prior to 1958.

[g] In agricultural employment, workers and employees only are counted. Collective farm labor force is *excluded*. The latter is variably estimated as between 38 and 42 million gainful participants in the mid-1950's.

[h] Lumber and timber industry excluded here; included in industry (I–1).

[i] Printing is excluded here; included in industry (I–1).

NOTE.—Table VI–42 presents original data, the estimated number of leading personnel and all the derived ratios and percentages, without attempting to "fill in" the missing figures, which could be easily estimated under the various assumptions, either by using employment weights or total leading personnel weights, etc. These derived figures, however, would not further our understanding of the composition of the top echelon of the Soviet labor force, and so were deliberately omitted.

Sources: Appendix tables VI–C–2–P and VI–C–2–SP; *Dos—1957*, pp. 259–60; *NarKhoz—1959*, pp. 658–59; *Zhenshchina*, p. 46.

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persons in the U.S.S.R. hold top managerial or specialists' jobs because of their experience rather than their formal training. Practicals thus account for varying shares (col. E) of Soviet leading personnel (col. B) in various industry sectors; in public health only 6.5 percent of all leading personnel were practicals and in education, 16.7 percent. In manufacturing industries, however, their share was 48.5 percent and in trade and distribution, practicals accounted for 78.7 percent of all leading personnel. As would be expected, the highest proportion of higher education graduates among leading personnel was in research and development (50.2 percent of the total); yet the share of practicals in this sector was somewhat higher (22.5 percent) than in the education or public health sectors.

In American industry, trade and commerce, there are also more practicals among professional and managerial personnel than in social services (education, health), where the greater proportion of jobs are held by persons with a college education. While there is not a large number of persons with secondary specialized education in the United States (graduates of vocational schools and technical institutes), the U.S.S.R. makes extensive use of semiprofessionals. In fact, 38.8 percent of all leading jobs are filled by formally trained Soviet semiprofessionals. In American practice, however, similar jobs are often filled by college graduates.

There is a striking similarity between United States and Soviet conditions in that in 1956 Soviet leading personnel (which is really an occupationally defined employment category) accounted for 18.5 percent of the U.S.S.R.'s employment of workers and employees, while in the United States the combined total of professional, technical and kindred workers and managers, officials, and proprietors (except farm) accounted in 1950 for 17 percent of all United States employees. These two American occupational categories included about 3 million college graduates, or about 30.4 percent of all persons employed in these occupations. In the U.S.S.R. in 1956, 28.1 percent of the leading personnel had completed higher education.

While these similarities are striking, there are differences as well. In the U.S.S.R. *all* higher education graduates employed in the national economy were accounted for among the employment categories of the leading personnel. In the United States, however, many other occupational groups also had some college graduates in their ranks, and there was thus here a wider diffusion of the college graduate population among the various occupational groups. This difference is partly a matter of Soviet definition, but it is also a reflection of the actual state of affairs in the Soviet Union: there is a pronounced concentration of higher education graduates in jobs specifically designated as "leading positions."

The Employment of Women in the U.S.S.R. and the Role of Women among Soviet Professionals and Semiprofessionals

Before we proceed further with the discussion of patterns of employment of Soviet leading personnel and specialists in individual branches and sectors of the Soviet economy, we have to return once again to a very important topic, the role of women in the Soviet economy and in professional and semiprofessional occupations in particular.

1. *The Soviet Population and the Participation of Women in the Soviet Labor Force*

There are in the Soviet population today about 20 million more women than men.[70] Only up to the age of 20 is the number of males somewhat higher than the number of females. In 1959, some three-fourths (15.3 million) of the surplus of females was concentrated in the working-age group (15-59) of the population. The sex ratios were as follows:

	Males	*Females*
Total population (208.8 million)	45	55
Working-age population, 15-59 (128.5 million)	42	58

For almost 15 years following the end of World War II, outside observers have been kept guessing (and usually guessed too low) as to what the Soviet Union's male casualties were during the war. Now it has become obvious that they were staggering indeed. In the last few years, since the Soviet Union has partially

[70] Appendix table II–A–5.

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relaxed the secrecy surrounding population data, Soviet demographers have repeatedly said that the deficit of males in the U.S.S.R. was almost exclusively the result of the Second World War. It should not be overlooked, however, that Soviet population losses (particularly among males) had already begun to occur during the 1930's, when forced collectivization and a reign of terror (purges and concentration camps) caused heavy, multi-million losses, among the male population especially. The blame should thus be laid not to the war alone, but also to forced industrialization, which resulted in a heavy toll of human lives. But whatever the reasons, the fact is that the Soviet regime has had to place great reliance upon womanpower as an economic resource, quite apart from all the rationalization and pompous pronouncements concerning the "equality of employment opportunity" for women.

Table VI–43 summarizes the rates of participation of the Soviet working-age population in employment of all types. The greatest uncertainty in dealing with the Soviet employment situation is connected with the fact that while Soviet authorities do release some meaningful aggregate figures on the category called "workers and salaried employees," it is always necessary to rely upon some crude estimating procedure for agricultural employment.

TABLE VI–43.—*Soviet population, labor force and gainful employment, by sex, 1958*

[In millions]

	Total	Male	Female	Female surplus
Population (January 1959):				
Total	208.8	94.0	114.8	20.8
Urban	99.8	[a](48.0)	[a](51.8)	3.8
Rural	109.0	[a](46.0)	[a](63.0)	17.8
Working-age labor force (15–59)	128.5	56.6	71.9	15.3
Employment:				
1958 employment for workers and employees [a]	54.6	29.0	25.6	.....
Armed forces	[b]3.6	(3.3)	(0.3)	.....
Collective farms and other employment	[c](42.0)	[d](19.0)	[d](23.0)	.....
Total	100.2	51.3	48.9	.....
Participation rate (percent) in working-age labor force	77.9	92.1	68.1	.....

[a] Population by rural and sex breakdowns are the author's estimates (on the basis of ratios of educational attainment by rural/urban and male/female categories, in *Narodnoe obrazovanie*, No. 3, 1960, p. 12).

[b] Military forces as announced by Khrushchev in *Pravda*, Jan. 15, 1960. The real figures may be somewhat higher. The distribution by sex is hypothetical.

[c] Estimated number of collective farmers in conventional man-years is 38 million (see sources and notes to table VI–33 below). The estimates range from 35 to 42 million depending upon assumptions. In addition, there are 3 to 4 million cooperative and individual craftsmen and artisans and some 300,000 noncollectivized peasants.

[d] Sex breakdown of employed rural labor is assumed to be proportionate to ratios of rural population by sex.

[e] Employment of workers and employees from *NarKhoz–1959*, p. 658. This category includes about 6,800,000 workers and employees of state-run agricultural enterprises.

Sources and notes: Appendix table II–A–5 and sources indicated in footnotes.

About 92 percent of the working-age males were engaged in the economic activities of the Soviet Union. The rate for working-age females was about 68 percent. Comparing the figures with similar data for the United States (1958), we observe that, in absolute terms, over twice as many females were employed in the U.S.S.R. (about 49 million) as there were in the United States (about 22 million), resulting in a much higher rate of female participation in total employment on the Soviet side (about 68 percent vs. 43 percent in the U.S.).

2. *Women among Workers and Salaried Employees by Branch and Sector of the Soviet Economy, 1928, 1958*

Table VI–44 presents figures on the employment of women in the U.S.S.R. in 1928 and 1958. It is evident from these data that the process of integrating women into the Soviet industrial labor force (women workers and employees increased by 22.5 million) took place primarily through the placement of women in jobs in manufacturing, transportation and utilities. Even before the

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TABLE VI–44.—*Soviet workers and employees, total and women, 1928 and 1958*

[In thousands and percent]

Branch and sector of the economy	1928			1958		
	Total	Women	Percent	Total	Women	Percent
I. Industry and related	5,943	1,284	22	31,572	12,650	40
1. Industrial enterprises (manufacturing, mining, public utilities), intraunit employment only	3,773	1,019	28	19,641	8,814	45
2. Construction enterprises	723	64	7	4,369	1,335	30
3. Transportation and communication	1,365	155	11	6,236	1,945	31
a. Transportation	1,270	122	9	5,568	1,525	28
b. Communication	95	33	28	668	420	62
4. Research and development	82	46	54	1,326	556	41
II. Agriculture (workers and employees only)	1,735	416	24	6,641	2,006	31
III. Trade and distribution	587	133	19	4,234	2,790	66
IV. Government administration, economic management and planning organs	1,401	599	42	4,662	2,500	54
1. Government administration, economic management and planning organs	1,010	225	22	1,286	803	62
2. Banking, credit and insurance	95	(a)	.....	259	(a)	.....
3. Urban housing management and municipal services	147	(a)	.....	1,697	(a)	.....
4. Other, unspecified	149	(a)	.....	1,420	(a)	.....
5. Residual	.....	374	.....	.....	1,697	.....
Total: National Economy, Production, Distribution and Management	9,666	2,432	25	47,109	19,946	42
V. Educational-cultural services	725	403	54	4,404	3,051	69
VI. Public health (medical and public health institutions, sanatoria, rest homes, etc.)	399	283	65	3,087	2,613	85
Total: Social Services	1,124	686	61	7,491	5,664	76
Grand total	10,790	3,118	27	54,600	25,610	46

[a] Included in the residual.

Sources: *NarKhoz–1959*, p. 658; *Zhenshchina*, pp. 33–34.

Soviet industrialization drive (1928), 65 percent of all employees in the field of health and 54 percent in education were women. In the course of the last three decades the proportion of women employed in these fields has continued to increase, with the result that by 1958 women occupied 85 percent of the jobs in the health field and 69 percent in education.

The largest gains in the employment of women were made, however, in industrial enterprises, where their share of jobs increased from 28 percent in 1928 to 45 percent in 1958. In absolute numbers, during the 30-year period the increment of female employment in Soviet industry was 7.8 million, which was substantially larger (by about 2.8 million) than the total increase of female employment in the social service fields of health and education. Though women do not outnumber men in the production branches of the economy, they nevertheless represent a very sizeable component of the Soviet work force in this sector.

3. *Women among Soviet Professionals Employed in the National Economy by Specialty Field*

During the last 30 years, the participation of women in professional occupations in the Soviet Union has increased considerably. The influx of women graduates into the economy during this period has resulted in a total stock of professionals indicated by specialty field and sex in table VI–45.

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TABLE VI–45.—*Total number of professional higher education graduates employed in the national economy of the U.S.S.R., by specialty field and sex, as of Dec. 1, 1959*

Specialty field	Total (thousands)	Women (thousands)	Proportion of women (percent)
Engineers	986.6	293.3	29.6
Agronomists, veterinarians, animal breeding specialists, foresters	222.4	86.9	39.1
Economists, statisticians, merchandising specialists	193.9	110.5	60.0
Jurists	65.5	21.0	32.1
Educational-cultural specialists: teachers, librarians, etc.	1,278.9	836.9	65.5
Physicians	378.6	285.4	75.5
Total	3,125.9	1,634.0	52.3
Residual	109.8	66.9	61.0
Reported grand total	3,235.7	1,700.9	52.5

Source: *NarKhoz–1960*, pp. 604, 615. Residual is composed of arts, physical culture and other minor categories.

Table VI–46 summarizes the changes in the relative proportion of women among Soviet professionals by branch specialty.

Although the proportion of women in agricultural and socioeconomic fields increased during the 1930's, there was no significant increase during that period in the proportion of women professionals employed in other fields (engineering, medicine, education). The influx of women professionals is apparent in all fields during the 1940's and 1950's, and there was a substantial gain in all fields combined. The influx of large numbers of women into education and health fields was particularly heavy. These two fields attracted a steadily increasing proportion of all graduates, with women heavily represented among them.

TABLE VI–46.—*Relative proportion of women among Soviet professionals, 1929, 1940, 1957, and 1959*

Branch specialty	Percent of women among all professionals			
	1929	1940	1957	1959
Engineering	14.7	14.8	28.6	29.6
Agricultural	9.2	25.2	38.4	39.1
Socioeconomic	8.2	26.4	50.7	52.5
Educational-cultural	21.0	20.9	71.9	75.5
Health	47.2	48.2	65.0	65.5
All fields	23.5	34.4	52.2	52.5

Sources: 1929 distribution: *NarKhoz–1932*, pp. 488–540; *Itogi pervogo FYP*, p. 217. 1940 and 1957 distribution: *NarKhoz–1959*, p. 690; 1959 distribution: *NarKhoz–1960*, p. 615.

The biggest increase in the relative proportion of women among professionals has taken place since World War II. In the main, three factors account for this. First, the ratio of women to men among students (and graduates) increased substantially, which of course affected additions to the professional labor force. Second, there were large numerical increases of professionals in the medical and education fields, where the relative proportion of women continued to be extremely high. Finally, there were heavy losses of professional male graduates due to the direct impact of World War II (i.e., both military and civilian casualties), which considerably depleted the prewar stock of male graduates.

The relation between the share of women in professional employment and the proportion of women among workers and employees was as follows:

	1928	*1940*	*1957*	*1959*
Proportion of women among all workers and employees	27	38	48	47
Proportion of women among all professionals	23	34	52	53

In both instances the trend has been one of steady gain, but in the postwar period the proportion of women among professionals surpassed their share among all workers and employees.

4. *Women and Semiprofessional Employment*

Table VI–47 presents data on the number of women with semiprofessional education employed in the Soviet economy. Two-thirds of all Soviet semiprofessionals are women. Even among industrial technicians, women account for two-fifths of all semiprofessional specialists. In the fields of health (91 percent) and in education (79 percent), women semiprofessionals dominated heavily. The proportion of women among semiprofessionals was substantially higher than their proportion among professionals as well as among workers and employees.

These facts have a bearing upon the earlier

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TABLE VI–47.—*Total number of semiprofessional graduates employed in the national economy of the U.S.S.R., by specialty field and sex, as of December 1, 1957*

Branch specialty	Total (thousands)	Women (thousands)	Proportion of women (percent)
Engineering technicians and industrial aides	1,257.3	499.2	39.6
Agricultural specialists, veterinary aides, agronomic aides, etc.	310.0	122.8	39.7
Planning specialists, accountants, statisticians, etc.	294.6	217.0	73.5
Jurisprudence specialists	20.4	6.0	29.5
Educational-cultural specialists: preschool and elementary school teachers	971.5	772.6	79.4
Medical-health technicians, nurses, dentists, etc.	980.3	894.6	91.2
All fields	4,016.1	2,623.4	65.3

Source: *NarKhoz–1959*, p. 691. Residual is composed of arts, physical culture and other minor categories.

discussion of attrition rates. It was then pointed out that the annual attrition rates due to all causes among Soviet semiprofessionals continue to be substantially higher than among professionals. This is demonstrated in table VI–48,

TABLE VI–48.—*Total number of semiprofessionals in the Soviet population and semiprofessionals employed in the national economy, by sex, 1959*

[In thousands]

	Male	Female	Total
Population of persons with secondary specialized education (Jan. 1959)	3,414	4,456	7,870
Semiprofessionals employed in the national economy (year end 1959)	1,549	2,900	4,449
Percent of semiprofessionals employed in the national economy	45.5	65.0	57.0

Sources and notes: *Pravda*, Feb. 4, 1960; appendix table VI–B–2–SP. The 1959 distribution by sex of semiprofessionals employed in the national economy is estimated on the basis of the 1958 ratio for sexes, in *Zhenshchina*, p. 59; and table VI–47 above.

comparing, on the basis of the latest Soviet census, the total stock of semiprofessional graduates in the Soviet population with the actual employment of semiprofessionals in the civilian labor force.

The retention of semiprofessional graduates in gainful employment (57 percent) is substantially below that for professionals (74 percent). For this the heavy participation of women in semiprofessional employment, with their high rates of withdrawal, is responsible, but only partly. The withdrawal of males from the ranks of the semiprofessional labor force is also much higher than it is from professional work—a phenomenon that can be explained partly by the fact that a significant proportion of semiprofessionals withdraw from gainful employment to continue their education. In addition, many male semiprofessional graduates are drafted for military service,[71] which also constitutes a severe drain upon employment in that category.

5. *Women among Leading Administrative, Managerial and Specialized Personnel*

Table VI–49 presents data on Soviet leading personnel by branch and industry sector and the number and proportion of women thus employed as of 1957. As the table reveals, the proportion of "leading personnel" positions held by women varied significantly from field to field (see col. E). Thus, in industry and construction women occupied only 31 and 22 percent, respectively, of the "leading personnel" jobs. In education and cultural services and in public health, however, women represented 66 and 88 percent, respectively, of the "leading personnel."

If the proportion of women in the "leading personnel" category (col. E) is compared with the proportion of women among all workers and employees (col. F), it becomes apparent that in all branches and sectors of the Soviet economy, except public health and research and development, the proportion of women in the workers and employees category is considerably higher than the proportion of women em-

[71] This practice is quite the reverse of the situation in the United States, where many semiprofessionals are trained by the military establishment and, upon discharge, find employment in the civilian economy.

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TABLE VI–49.—*Leading administrative, managerial and specialized personnel in various branches and sectors of the Soviet economy, total and by sex, as of January 1, 1957*

Branch and sector of the economy	Total Personnel		Employment of women			Women among all workers and employees
	(A) Thousands	(B) Percent	(C) Thousands	(D) Percent	(E) Percent of total	(F) Percent
I. Industry and related sectors	3,322	35.5	1,065	21.7	32	40
1. Industrial enterprises (manufacturing, mining and public utilities), intra-unit employment only	1,845	19.7	572	12.2	31	45
2. Construction enterprises (building and structural assembly)	332	3.5	73	1.6	22	30
3. Transportation and communication	576	6.1	159	3.4	28	31
a. Transportation	424	4.5	89	1.9	21	28
b. Communication	152	1.6	70	1.5	46	62
4. Research, design and development	579	6.2	261	5.5	45	41
a. Research institutes	246	2.6	128	2.7	52	.....
b. Project institutes	167	1.8	72	1.5	43	.....
c. Design institutes	92	1.0	35	.7	38	.....
d. Geological surveying	74	.8	26	.6	35	.....
e. Meteorological services	.....	.....	.....	.....	.....	.....
II. Agriculture (workers and employees only)	567	6.1	119	2.5	21	31
5. Machine-tractor stations, repair-technicial stations and collective farms	.....	.....	.....	.....	.....	.....
6. State farms and auxiliary agricultural processing establishments	.....	.....	.....	.....	.....	.....
7. Forestry service	.....	.....	.....	.....	.....	.....
III. Trade and distribution (trade organizations, procurement and material-technical supply organizations, restaurants, public dining and catering services)	574	6.1	264	5.6	46	66
IV. Government administration, economic management and planning organs	1,141	12.2	500	10.7	44	54
8. Government administration, economic management and planning organs	.....	.....	.....	.....	.....	.....
9. Banking, credit and insurance	.....	.....	.....	.....	.....	.....
10. Urban housing management and municipal services	.....	.....	.....	.....	.....	.....
11. Other, unspecified	.....	.....	.....	.....	.....	.....
12. Residual	1,141	12.2	500	10.7	44	.....
Total: national economy, production, distribution and management	5,614	59.9	1,948	41.5	35	42
V. Educational-cultural services	2,510	26.9	1,645	35.3	66	69
13. General education schools and preschools	1,839	19.7	1,321	28.3	72	.....
14. Professional and semiprofessional training establishments	392	4.2	153	3.3	39	.....
15. Cultural services	214	2.3	150	3.2	70	.....
16. Editorial offices in publishing	38	.4	12	.3	32	.....
17. Arts and entertainment	27	.3	9	.2	33	.....
VI. Public health (medical and public health institutions, sanatoria, rest homes, etc.)	1,232	13.2	1,085	23.2	88	85
Total: Social services	3,742	40.1	2,730	58.5	73	76
Grand total	9,356	100.0	4,678	100.0	50	46

Source: *Zhenshchina*, p. 46.

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ployed as leading administrative, managerial and specialized personnel. Clearly, while Soviet women have made major advancements into leading positions, they do not yet occupy these jobs in numbers proportionate to their participation in total employment.

Soviet Industrial Employment and Managerial, Administrative and Specialized Personnel: Definition of Categories

The preceding sections have discussed the pattern of employment of workers and employees, leading personnel and higher education graduates in diverse branches of the Soviet economy. It is important now to consider the employment situation in specific branches, and in each branch we will consider the employment of higher education graduates in relation to total employment or specific categories within it. One such branch is Soviet industry, and the Soviet term for workers and employees in this branch is "industrial-production personnel" (*promyshlenno-proizvodstvennyi personal*).

The closest United States counterpart of this Soviet employment category would be wage earners and self-employed persons working in manufacturing, mining, power and gas utilities.[72] The main difference in the two categories is that Soviet industrial-production personnel is composed only of employees within a given industrial enterprise, plant or shop, or *intra-unit* employment only. The Soviet category excludes employees who participate in the industrial process indirectly, such as personnel employed in independent research, product or process design and development establishments (among these particularly the "industrial research institutes," which often are simply design and development offices for specific industry sectors); various sales, service, procurement and distribution organizations which supply the enterprise with materials or goods or else sell those produced by the enterprise; and most *extra-unit* (above plant level) offices and administrations engaged in cooperation, coordination, planning, accounting, and management activities for several groups of plants or even entire industry sectors. These organizations were originally people's commissariats, were subsequently called ministries, and now are known either as committees or councils on the national level, or offices of regional councils of the national economy on the local level. In the United States, on the other hand, industrial employment is an aggregation of intra-unit and extra-unit employments, i.e., personnel employed directly in, or indirectly involved with, individual plants, enterprises and corporations. United States employment is most commonly reported by major industry group on an establishment basis, including most employment in corporate structures (i.e., similar aggregates as Soviet trusts and combines) and personnel engaged in research and development. By the Soviet definition, extra-unit employments are excluded.

Within the Soviet category of industrial-production personnel, the following functional categories are singled out:

(1) *Industrial workers* (*rabochie*), who are subdivided into production workers (*proizvodstvennye rabochie*) and all types of *auxiliary workers* (*vspomogatel'nye rabochie*). The latter may be employed alongside of production workers or else in shops which are considered "auxiliary."

(2) *Apprentices* (*ucheniki*), which is primarily a payroll definition rather than a job description criterion, and which includes all persons taking individual or group training or retraining in a given skill, as well as those who have already acquired a skill but are still undergoing apprenticeship training or are paid according to the apprenticeship scale.

(3) *Junior service personnel* (*mladshii obsluzhivaiushchii personal*, or *MOP*), who have service functions (i.e., guarding the premises, maintaining buildings and grounds not directly used in production, fire-prevention, etc.).

(4) *White-collar employees* (*sluzhashchie*), who have administrative or office functions not directly involving production or engineering, such as commercial and financial transactions, accounting, and office management. Included in this category are deputy directors of plants and enterprises in charge of divisions or offices of finance, procurement and distribution, employment, statistical reporting and accounting, on-the-job training, and all accountants, bookkeepers, timekeepers, statisticians, secretarial and office help.

(5) *Engineering-technical, supervisory and managerial personnel* (*ETMP*) (*inzhenerno-tekhniche-*

[72] See discussion in M. Feshbach, *The Soviet Statistical System: Labor Force Recordkeeping and Reporting*, International Population Statistics Reports, Series P–90, No. 12, Washington, D.C.: U.S. Dept. of Commerce, Bureau of the Census, 1960, esp. pp. 99–101. See also appendix VI–Q.

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skie rabotniki), which includes all persons who perform the function of technical guidance and supervision of the production process, either main or auxiliary. Its members perform in theory functions which should require the specialized professional or semiprofessional training of an engineer or technician, but in fact they are sometimes only "practicals" (*praktiki*) without formal specialized education.

ETMP is thus an occupational category composed of persons holding jobs requiring, from the viewpoint of the Soviet planners, specialized knowledge or skill obtained through either formal training or on-the-job experience. Ideally, the majority of such slots should be filled by personnel with formal specialized training; actually, this is far from being the case.

The *ETMP* positions are specified by special job description lists prepared by the Central Statistical Administration (*TsSU—Tsentral'noe Statisticheskoe Upravlenie*) and the State Planning Committee (*Gosplan*).[73] The Chief Administration on Staffs (*Glavnoe Shtatnoe Upravlenie*) of the Ministry of Finance [74] is responsible for seeing to it that these positions are filled, and their holders rewarded in conformity with the job description lists for *ETMP*.

According to these lists, the *ETMP* category includes:

(1) Directors of plants and industrial enterprizes;
(2) Deputy directors concerned with all processes of production or engineering-technical or technological aspects of production;
(3) Chiefs or heads (*zaveduiushchie*) or officers of divisions of an enterprise, plant, or its shops, such as offices in charge of technology, engineering, design and development, power supply, capital construction, quality control and production scheduling;
(4) Shop superintendents and their deputies in charge of any aspect of production or engineering;
(5) All engineers and technicians who have any function of production or engineering management or supervision, or who are employed in offices or divisions of an enterprise, plant or its shops;
(6) Foremen and their deputies.

Excluded from the *ETMP* category are trained specialists, engineers or technicians who are (1) employed in production directly (such as operating or maintaining complex machinery and thus not directing the activity of others); (2) working in white-collar jobs without administrative or supervisory functions.[75]

"Leading personnel," on the other hand, is a reporting category combining *ETMP* with trained specialists (professionals and semiprofessionals) regardless of where they are employed. The difference between "leading personnel" and *ETMP*, then, is that the former category is more inclusive than the latter. Embraced in the term "leading personnel" are all specialists with or without administrative functions, though the latter are not normally included in the *ETMP* category.

This study is obviously most concerned with employment in the *ETMP* and leading personnel categories since the majority of professionals and semiprofessionals employed in Soviet industry are employed in these two groups. However, since *ETMP* is defined in functional terms to include persons directly or indirectly supervising the process of production, as well as persons employed in such production but who do not personally perform worker functions, the terms are arbitrary, and there is obviously some overlapping of the *ETMP* category with the white-collar category, particularly those white-collar workers who have administrative and office functions. The latter category as well includes some professionals and semiprofessionals. The arbitrariness of the definition of *ETMP* is further evident from the fact that while, in most branches of industry, ordinary foremen are included in the *ETMP* category, in some branches (coal mining, for example), they are excluded. Finally, the definition of the *ETMP* category changes somewhat over time, but this is of course a general problem in working with employment time series.

The major activity of a unit, such as a chemical plant, machine building plant, coal mine, food processing factory, textile plant, etc., de-

[73] During the period 1941–53 these jobs were approved by the State Commission on Staffs (*Gosudarstvennaia Shtatnaia Komissiia*). The exact date of the abolition of the commission as an independent unit is not known.

[74] Again, between 1941 and 1953[?] these functions were exercised by the State Commission on Staffs.

[75] In the United States, the term "white-collar" jobs applies to the business staff in the front office, i.e., clerical, administrative and managerial employees below the executive level. In the Soviet case, white-collar jobs include mainly clerical employees, and all persons with administrative and managerial functions, regardless of whether they are employed in the plant or the office, are counted as *ETMP*.

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termines the industry sector. There are 11 major subdivisions in Soviet industry:[76]

1. Metallurgy, ferrous and nonferrous
2. Fuels, extracting and processing
3. Electric power, including distribution
4. Chemical industry, including rubber and asbestos
5. Machine building, equipment and instrument manufacturing, and metal working
6. Lumbering, wood products and paper industry
7. Construction materials, including glass and ceramics
8. Printing
9. Light industry, including textiles, garment, fur and leather industries
10. Food processing
11. Other miscellaneous industries

All types of employments (production workers, office employees, auxiliary personnel, and such categories as leading personnel and *ETMP*—and within them, trained specialists who are professionals or semiprofessionals) are grouped into these industry sectors.

We have gone to some length in defining Soviet employment categories in order to try to avoid ambiguity in considering several analytical problems: (1) How many professionals and semiprofessionals are employed in each sector of Soviet industry; (2) how do their numbers relate to the number of (a) production workers, (b) *ETMP*, and (c) leading personnel; and (3) how does the number of engineers actually employed in the different sectors of Soviet industry relate to the specialized fields in which they were initially trained.

[76] For a detailed classification of Soviet categories, and a comparison with United States categories, see appendix VI–Q.

Leading Personnel in Soviet Industry, 1957

Table VI–50 presents data on the occupational composition, numbers, sex and distribution of leading personnel (defined in terms of *intra*-unit employment) employed in Soviet industry

TABLE VI–50.—*Leading administrative, managerial and specialized personnel in Soviet industrial enterprises (intra-unit employment) by occupation and sex as of January 1, 1957*

Occupations	Total personnel		Employment of women		
	Thousands	Percent	Thousands	Percent	Percent of total
Directors of industrial enterprises, chief engineers and other leading specialists and their deputies	131.0	7.1	13.1	2.3	10
Heads and their deputies of administrative units, bureaus, and other structural subdivisions of plant main administrations, shops and laboratories	172.7	9.4	44.9	7.8	26
Heads of shops and their deputies	192.8	10.4	27.0	4.7	14
Shift supervisors, production unit supervisors, section unit supervisors, and heads of divisions within shops	72.1	3.9	17.3	3.0	24
Engineers, without administrative functions[a]	298.1	16.2	113.3	19.8	38
Technicians, without administrative functions[a]	145.2	7.9	85.7	15.0	59
Foremen	462.4	25.1	97.1	17.0	21
Laboratory technicians	21.9	1.1	20.6	3.6	94
Expediters and dispatchers	32.1	1.7	12.2	2.1	38
Chief accountants and head bookkeepers	87.0	4.7	38.3	6.7	44
Engineer-economists, economists and planning specialists	60.8	3.3	45.0	7.9	74
Subtotal	1,676.1	90.6	514.6	89.9	31
Other unspecified leading industrial personnel	169.0	9.4	57.5	10.1	34
Grand total	1,845.1	100.0	572.0	100.0	31
Professionals with completed higher education in the grand total	320.0	17.3	.....	.....	.....
Semiprofessionals with secondary specialized education in the grand total	630.0	34.2	.....	.....	.....
Practicals without specialized education	895.1	48.5	.....	.....	.....

[a] Refers largely to specialists with completed higher or secondary specialized education, but not exclusively limited to persons with such education.

Sources: *Zhenshchina*, p. 47. All data on leading personnel and women are from this source. Professionals and semiprofessionals: figures from appendix tables VI–C–2–P and VI–C–2–SP.

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in 1957. The table also relates the leading personnel figures to the total number of trained specialists working in Soviet industrial enterprises.[77] Professionals with higher education accounted for 17.3 percent of all leading personnel, semiprofessionals for 34.2 percent, and 48.5 percent of the leading personnel were practicals. The total number of leading personnel (1,845,100) exceeded by some 156,000 the 1,689,000 *ETMP*.[78]

The data on the occupational structure in Soviet industry reveal that slightly over one-fourth of all leading personnel (first four rows) were engaged in top managerial and supervisory jobs. Another fourth (next two rows) were active as specialists (engineers and technicians) without managerial functions, and the remaining one-half (last five rows) were reported as holding routine supervisory and minor technical jobs (foremen accounted for 25 percent of all leading personnel).

An examination of the composition of leading personnel by sex indicates that while women accounted for 31 percent of all leading personnel, they held only 10 percent of the top-echelon executive positions (directors of industrial enterprises, chief engineers, etc.). Among heads of shops and their deputies, women accounted for 14 percent. However, in low-ranking administrative, specialized, and supervisory positions (laboratory technicians, technicians without administrative functions, all sorts of economic, accounting and planning specialists, etc.) the incidence of women was remarkably high. It is evident that the advancement of women into top management posts has been limited, considering the fact that women represent 45 percent of all workers and employees in Soviet industry (see table VI–49).

Historical Trend in the Employment of ETMP in Relation to Total Employment in Soviet Industrial Enterprises

Table VI–51 below presents a summary of data on total industrial employment (col. A), production workers (col. B), and intra-plant employment of *ETMP* (col. C). From these data the ratio of *ETMP* per 1,000 production workers (col. D) and the percentage of *ETMP* among all industrial employees (col. E) have been derived. Columns D and E are of particular analytical interest.

In examining the data in table VI–51, some notable divergencies in the figures reported for individual years are observed. These are caused primarily by the fact that the data actually refer to different categories of reporting yearly employment. There is reporting of large-scale industry only (or "census" industry, as it is sometimes referred to in Soviet sources), which was a category commonly used in Soviet reports until about 1936–37. Since then, and particularly in postwar sources, references are made to figures covering all industry. Furthermore, some of the data in the table refer to average annual employment, while others refer to employment as of January 1 of a given year. These differences are all properly indicated in the table, and they do not affect appreciably the ratios of *ETMP* to total employment.

It is to be particularly emphasized that despite the fact that there are differences in coverage and that the data were compiled from a variety of primary sources spread over the last three decades, the ratios in a given year or in neighboring years display a pattern of remarkable consistency, which lends additional credibility to Soviet statistical reporting of this type. Thus, despite the difficulties resulting from diversified coverage, the employment trends of *ETMP* can be ascertained with reasonable reliability.

The general trend in *ETMP* employment may be summarized as follows. During the period 1928–59 the number of *ETMP* in Soviet industrial enterprises grew from about 120,000 to 1,800,000, or 15-fold, while the index of growth of total employment in 1959 was 536 percent of that in 1928. Thus, the rate of growth of *ETMP* was about 3 percent for each percentage increase in total employment.

In 1937 the *ETMP* employment actually achieved was higher than that which was initially planned. Also in 1941 the total number of *ETMP* and their ratio to workers exceeded planned figures for 1942. For 1950, however, the planned ratio of 120 *ETMP* per 1,000 production workers was not realized, and was not

[77] Appendix tables VI–C–2–P and VI–C–2–SP.
[78] *NarKhoz–1959*, p. 131; table VI–51 below.

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TABLE VI–51.—*Total industrial employment, production workers, ETMP and ratios of ETMP in Soviet industry, 1913–59*

Type and date of reporting		A	B	C	D	E
		Total employment (thousands)	Production workers (thousands)	*ETMP* (thousands)	*ETMP* per 1,000 production workers	Percent *ETMP* to total employment
U.....1913	LS.....	2,885.0	2,592.0	46.5	18.0	*1.62
Jan. 1.....1925	LS.....	1,980.7	1,781.9	62.2	*34.9	*3.14
Jan. 1.....1928	LS.....	2,924.9	2,531.9	92.1	*36.4	*3.15
U.....1928	U.....	.....	.....	.....	38.0	.....
Av. An.....1928	T.....	3,773.0	3,124.0	119.0	*38.1	*3.15
Jan. 1.....1929	LS.....	3,207.6	2,788.7	97.3	*34.9	*3.03
Jan. 1.....1930	LS.....	3,605.9	3,116.2	112.6	*36.1	*3.12
U.....1930	U.....	.....	.....	.....	35.5	.....
Jan. 1.....1931	LS.....	4,962.0	4,256.4	193.1	*45.4	*3.89
U.....1932	U.....	.....	.....	.....	69.0	.....
Jan. 1.....1932	LS.....	6,326.2	5,271.3	290.9	*55.2	*4.60
Av. An.....1932	LS(X)....	6,302.6	4,668.5	331.3	*71.0	*5.26
Av. An.....1932	T.....	8,000.0	6,007.0	420.0	*70.0	*5.25
Jan. 1.....1933	LS.....	6,395.8	5,139.7	376.6	*73.3	*5.89
Jan. 1.....1934	LS.....	6,386.1	5,215.0	391.7	*75.1	*6.13
Jan. 1.....1935	LS.....	6,859.8	5,658.3	446.0	*78.8	*6.50
Jan. 1.....1936	LS.....	7,493.6	6,173.0	509.1	*82.5	*6.79
U.....1936	U.....	.....	.....	.....	70.5	.....
U.....1937	LS.....	8,400.0	.....	*730.0	.....	8.70
Av. An.....1937	LS-P.....	8,130.0	6,361.9	520.0	*81.4	*6.40
Av. An.....1937	T.....	10,112.0	7,924.0	722.0	*90.9	7.14
Av. An.....1937	T(X).....	10,111.7	8,048.9	697.7	*86.7	*6.90
U.....1938	U.....	.....	.....	.....	.....	9.70
Av. An.....1940	T.....	10,967.0	8,290.0	932.0	*112.4	*8.49
U.....1941	U.....	.....	.....	.....	110.0	.....
Av. An.....1941	LS-P.....	9,787.5	7,575.1	836.5	*110.4	*8.56
Av. An.....1942	T-P.....	11,899.0	9,184.0	910.0	*99.1	*7.65
Av. An.....1946	T.....	9,508.0	.....	.....	.....	.....
U.....1950	U-P.....	.....	.....	.....	120.0	.....
Av. An.....1950	T.....	14,144.0	11,308.0	1,197.0	*105.8	*8.46
Av. An.....1954	T.....	17,016.0	13,818.0	1,530.0	*110.7	*8.99
Av. An.....1955	T.....	17,362.0	14,275.0	1,543.0	*108.1	*8.89
Av. An.....1956	T.....	18,500.0	15,226.0	1,637.0	*1 5	*8.84
Av. An.....1957	T.....	19,144.0	15.760.0	1,689.0	*10	*8.82
Av. An.....1958	T.....	19,641.0	16,219.0	1,750.0	*107	*8.90
Av. An.....1959	T.....	20,205.0	16,791.0	1,803.0	*107.5	*8.90

* Computed figures.

Symbols:
P—Planned.
U—Unspecified.
T—Total industry.
LS—Large-scale industry only.
Av. An.—Average annual.

Sources and Notes

Introductory note.—The data exclude employees of producers' cooperatives and some small auxiliary enterprises. The number of employees in producers' cooperatives was 1,100,000 in 1958. In recent years there has been a gradual transfer of producers' cooperatives to industrial enterprises.

Place in table — Sources and notes

1913 LS, col. A.—*NarKhoz—1932*, p. 410.
1913 LS, col. B.—*Sots Stroi—1935*, p. 486.
1913 LS, cols. C, D.—I. Liasnikov, *Podgotovka spetsialistov promyshlennosti SSSR*, p. 79 (col. D consistent if computed).
1925, 1928–36 LS, cols. A, B, C.—*Trud—1936*, p. 91.
1928 U, col. D; 1932 U, col. D.—*Itogi pervogo FYP*, p. 274.
1928, 1936 T, col. A.—*NKh—1956*, p. 190.
1928 T, cols. B, C.—*Dos—1957*, pp. 50–51.
1937 LS, cols. A, E; 1938 U, col. E.—E. L. Granovskii *et al.*, *Ekonomika sotsialisticheskoi promyshlennosti*, p. 493.
1932 LS (X), cols. A, B, C; 1937 LS–P, cols. A, B, C.—*Vtoroi FYP*, p. 504.
1932, 1937, 1940, 1950, 1954, 1955 T, cols. A, B, C.—*NKh–1956*, p. 44.
1930, 1936, 1941 U, col. D; 1950 U–P, col. D.—Liasnikov, *Podgotovka*, p. 80.
1941 LS–P, cols. A, B, C.—*Plan 1941*, p. 512.
1937 T(X), cols. A, B, C; 1942 T–P, cols. A, B, C.—*Tretii FYP*, p. 229.
1956 T, cols. A, B, C.—*NarKhoz—1959*, p. 131.
1957 T, cols. A, B, C.—*NarKhoz—1959*, p. 131.
1958 T, cols. A, B, C.—*NarKhoz—1959*, p. 131.
1959 T, cols. A, B, C.—*NarKhoz—1960*, p. 138.

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approached even by 1959, when it was 107.5. This provides one explanation for the intensified campaign which began in 1956 to channel a greater number of administrative personnel and specialists into production units, as well as for the present drive to step up the training of new *ETMP*. The relative stability of the *ETMP* ratio (about 108) to production workers during the period 1955–59 came about as a result of the situation that the expansion of *ETMP* barely kept pace with additions of new production workers.

TABLE VI–52.—*Distribution of ETMP employed in Soviet industrial enterprises by level of formal specialized education, 1928–59*

Date and type of reporting			Professionals with higher education	Semiprofessionals with secondary specialized education	Practicals	Total
			A	B	C	D
U.....1928	LS.....	Thousands....	13.7	10.5	75.8	100.0
		Percent.....	13.7	10.5	75.8	100.0
U.....1930	U.....	Thousands....	.....	.....	.....	.....
		Percent.....	19.7	22.5	57.8	100.0
Av.An. 1932	LS.....	Thousands....	50.7	71.8	208.8	331.3
		Percent.....	(15.3)	(21.7)	(63.0)	(100.0)
Nov. 1 1933	Cen.....	Thousands....	.....	.....	.....	.....
		Percent.....	22.3	18.7	59.0	100.0
U.....1936	U.....	Thousands....	.....	.....	.....	.....
		Percent.....	18.4	24.1	57.5	100.0
Av.An. 1937	LS-P.....	Thousands....	108.8	181.0	220.2	520.0
		Percent.....	(20.9)	(34.8)	(42.3)	(100.0)
Jan. 1 1941	T.....	Thousands....	153.0	158.0	621.0	932.0
		Percent.....	16.4	16.9	66.3	100.0
U.....1941	U.....	Thousands....	.....	.....	.....	.....
		Percent.....	17.9	21.2	60.9	100.0
Jan. 1 1946	U.....	Thousands....	.....	.....	.....	.....
		Percent.....	15.5	20.0	64.5	100.0
U.....1950	U—Planned	Thousands....	.....	.....	.....	.....
		Percent.....	23.7	50.8	25.5	100.0
U.....1950	U—Actual...	Thousands....	.....	.....	.....	.....
		Percent.....	20.8	29.2	50.0	100.0
Dec. 1 1956	T.....	Thousands....	320.0	630.0	687.0	1,637.0
		Percent.....	19.5	38.5	42.0	100.0
Dec. 1 1957	T.....	Thousands....	354.0	748.0	587.0	1,689.0
		Percent.....	20.9	44.3	34.8	100.0
Dec. 1 1959	T.....	Thousands....	443.0	1,025.0	335.0	1,803.0
		Percent.....	24.5	57.0	18.5	100.0

Symbols:
U—Unspecified.
LS—Large scale.
Cen.—Partial census of all specialists in industry as of 1-11-33.
Av.An.—Average annual.
P—Planned.
( )—Computed figures.
T—Total industry.

Sources and Notes

Year

1928.—*Za promyshlennye kadry*, No. 4, 1934, p. 12. This source also states the figures for 1932, which are identical with those reported in *Vtoroi FYP* (below).

1932, 1937.—*Vtoroi FYP*, p. 512.

1933.—These data refer to a census of specialists in *Sots Stroi—1935*, p. 524.

1946, 1950.—Liasnikov, *VVSh*, No. 4, 1948, p. 15 (ratios given there were converted to percentages).

1930, 1936, 1941, 1950.—Liasnikov, *Podgotovka*, p. 80 (ratios were converted to percentages; for 1950 ratios of 25:35:60 =120 were assumed to be valid).

1936 (*Not on table*).—For Jan. 1, 1936, *Trud—1936*, p. 302, reveals the trade union count of their "engineering-technical sections" with a composition of members in these sections by education as follows:

Higher education	21.6% of total
Secondary specialized education	31.7% of total

1941 (Jan.), 1956, 1957.—*Dos—1957*, pp. 51, 259; *NarKhoz—1959*, pp. 131, 675. For these years *ETMP* is average annual reporting and numbers of graduate specialists as of a given date.

1959.—*NarKhoz—1960*, pp. 138, 605.

NOTE.—The data on professionals and semiprofessionals for 1956, 1957, and 1959 refer to all such specialists employed in industrial enterprises. The majority of such specialists were employed in *ETMP* positions, though a small proportion may have been office employees or worked directly in production. If these latter positions were suotracted, the rates of employment of specialists among *ETMP* would be slightly lower, but there would be no appreciable influence on the trend in the ratios.

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Historical Trend in the Proportion of Specialists with Formal Training among Soviet ETMP in Industrial Enterprises

Table VI–52 presents a summary of the available data on the composition of *ETMP* by level of education. Of chief concern are the data in column A. Persons with completed higher education employed in Soviet industry are mainly engineers trained in higher educational establishments of the "industrial" branch. However, not all *ETMP* are graduate engineers. There are among them also economists, planning specialists and other professional graduates who have received other types of education. Some of these have presumably had professional training in the scientific fields.

In discussing the distribution of *ETMP* by level of education, Soviet sources are not explicit as to the exact type of higher education acquired by these specialists; the sources do reveal, however, that they are mostly graduates of engineering schools. An examination of job classifications also suggests that among the positions to be filled by higher education graduates, those for engineers predominate.

The data in table VI–52 reveal that during the 1930's and 1940's the proportion of higher education graduates among *ETMP* fluctuated between 15 and 22 percent. In the 1950's the proportion increased, and by 1959 was about 25 percent. Although some of the differences in percentages of professionals among *ETMP* may be attributed to differences in the reporting coverage, other variations were real. Thus the decline in the proportion of higher education graduates among *ETMP* reported in 1946 (15.5 percent) was undoubtedly the result of wartime losses.

An examination of tables VI–51 and VI–52 reveals, furthermore, that during the period 1932–59 the number of professionals employed in intra-unit *ETMP* positions in Soviet industry increased about 8-fold. However, because of the almost threefold increase in the number of production workers (1932—6,007,000; 1959—16,791,000) during the same period, the ratio of professionals per 1,000 workers in industrial enterprises increased only 2½ times—from 8 per 1,000 in 1932 (51,000 professionals; 6 million workers) to 29 per 1,000 in 1959 (443,000 professionals; 16.8 million workers). Consequently, the trend during this period was such that for each percentage point increase in the number of industrial workers, there was a 2.5 percent increase in the number of professionals. However, during the period 1941–56 there were only very small increases of professionals in relation to industrial workers—1941—20 per 1,000 (153,000 professionals; 7.6 million workers); 1956—22 per 1,000 (320,000 professionals; 15.2 million workers). This pattern of retardation in the growth of the ratio of professionals to production workers in Soviet industry was caused, in part at least, by the human losses incurred in World War II.

While in the early 1950's the ratio of professionals in *ETMP* positions hardly changed (21 percent in both 1950 and 1957), the ratio of semiprofessionals in such positions increased markedly: from 29 percent in 1950 to 58 percent in 1959. This is indeed a very important shift, which led to the Soviet contention that the employment of industrial and engineering technicians was reaching the saturation point as far as *ETMP* jobs were concerned. The result was a widespread campaign to employ technicians in skilled-worker jobs, a trend which is expected to intensify in the future [79] (and which brought about a revision in many technicum curricula).

Historical Trend in the Ratios of ETMP to Production Workers in Various Sectors of Soviet Industry

A summary of the computed ratios of *ETMP* per 1,000 production workers is presented in table VI–53. The prevailing trends may be ob-

[79] O. E. Gubareva, "Sovnarkhozy i voprosy podgotovki i ispol'zovaniia spetsialistov" (Regional Economic Councils and the Problems of Preparation and Utilization of Cadres of Specialists), in: Akademiia Obshchestvennykh Nauk pri TsK KPSS (Academy of Social Sciences of the Central Committee of the CPSU), A. G. Kulikov (ed.), *Iz opyta raboty sovnarkhozov i razvitiia khoziaistva raionov* (The Experiences of Work of the Regional Economic Councils and the Development of the Economies of the Regions), Moscow, 1959, p. 206.

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TABLE VI–53.—*Summary of ratios of ETMP per 1,000 production workers by sectors of industry for selected years, 1925–56*

Industry sector	A Large-scale 1925	B Large-scale 1928	C Total 1928	D Large-scale 1932	E Large-scale 1936	F Total 1940	G Plan 1941	H Hypothetical plan 1950	I Total 1956	J Ministerial reporting 1956
1. Metallurgy	37	39	38	55	64	105	102	115	99	.....
2. Fuels	47	46	48	34	65	106	57	105	110	109
3. Electric power stations	103	94	.....	97	130	.....	137	185	.....	.....
4. Chemical and rubber	48	81	43	113	131	177	157	140	142	.....
5. Machine building, equipment manufacturing and metal processing	57	61	66	98	116	174	185	155	150	156
6. Forest and wood products, paper	35	39	.....	58	49	.....	53	.....	.....	58
7. Building materials	43	42	.....	54	69	.....	87	90	.....	.....
8. Printing	50	45	.....	64	69	.....	.....	.....	.....	.....
9. Light industry	17	17	19	36	47	65	63	80	60	65
10. Foods	34	35	32	61	84	104	76	110	106	118
All-industry	35	36	38	55	83	113	110	118	108	.....

Sources and Notes

All ratios were computed from the following sources:
A, B, D, E.—*Trud–1936*, pp. 99–236.
G.—*Plan 1941*, pp. 513–28.
C, F, I.—*Dos–1957*, pp. 50–51.
H.—Liasnikov, *VVSh*, No. 4, Apr. 1948, p. 15.
J.—V. E. Komarov, "Podgotovka spetsialistov dlia narodnogo khoziaistva" (Planning of Specialists for the National Economy" in Ia. A. Kronrod (ed.), *Voprosy sotsialisticheskogo vosproizvodstva* (Problems of Socialist Reproduction), Moscow, 1958, p. 293.

Another Soviet source presents an earlier article by the same author: V. E. Komarov, "Nekotorye voprosy planirovaniia podgotovki spetsialistov" (Some Problems of Planning of the Training of Specialists), *Plan Khoz*, No. 9, Sept. 1957, p. 59. This article also states explicitly that the 1956 data refer to specific ministries (naming each one). Obviously by the time the 1957 article appeared in a symposium volume, the ministries had become defunct and Komarov simply refers to them as "industries," stating in a footnote that the data are based on ministerial reports as of Dec. 1, 1956. The same data are presented in V. E. Komarov, *Ekonomicheskie osnovy podgotovki spetsialistov dlia narodnogo khoziaistva* (Economic Problems for the Training of Specialists for the National Economy), Moscow, 1959, esp. pp. 70–71.

served from the data in this table.[80] In addition to the computed ratios based on actual or planned (for 1941) employment by industry branch, table VI–53 provides data of planned (hypothetical) ratios for 1950. The data show that there were wide differences between *ETMP* ratios to production workers according to industry sector. There is no doubt that substantial variations in the ratios of *ETMP* to production workers exist also among individual plants. For example, *ETMP* ratios in some machine-building plants in 1950 were 200 per 1,000 production workers.[81] In several other plants the ratios ranged from 200 to 228 *ETMP* per 1,000 production workers in 1954.[82] The data for some sectors of nonferrous metallurgy indicate that the *ETMP* ratio in 1954 was 119 to 1,000 production workers.[83] Likewise, the ratio of *ETMP* per 1,000 production workers in some ferrous metallurgy plants has reportedly ranged between 100 and 140 in recent years.[84]

Another conclusion which can be drawn from the data in table VI–53 is that there is a persistent pattern throughout the entire period 1925–56 of sector-industry differentials in *ETMP* ratios. The electric power, chemical and machine building sectors accounted for *ETMP* ratios well above the all-industry average. The

[80] Extrapolations based on the trends for the 1930's in regard to ratios of *ETMP* to production workers may have an inherent upward bias due to the differences in coverage (definitions of *ETMP*). The likelihood of this bias was one of the main reasons for abandoning the originally contemplated computations of regression equations as indicators of trends in the ratios and as a tool for purposes of long-run projections.

[81] Liasnikov, *Podgotovka*, p. 17.

[82] V. I. Ganshtak, *Sebestoimost' produktsii v mashinostroenii* (Cost Accounting of Output in Machine Building), Moscow, 1956, p. 95.

[83] S. A. Pervushin *et al.*, *Ekonomika tsvetnoi metallurgii SSSR* (Economics of Nonferrous Metallurgy in the U.S.S.R.), Moscow, 1956, p. 257.

[84] B. Ia. Riabinskii, *Planirovanie i ekonomika metallurgicheskikh zavodov* (Planning and Economics of Metallurgical Plants), Moscow, 1955, p. 393.

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metallurgy and fuels sectors were at par with, or fluctuated around, the all-industry average. The light industry, foods, printing, building materials and wood products sectors all lagged [85] behind the all-industry average. The persistent inter-sector differences would seem to indicate that *ETMP* ratios are related to various technological and organizational factors of production activity in the specific industries.

Total Employment of Professionals and Employment of Professional Engineers by Sector of Industry in 1959

Prior to the fall of 1960 comprehensive data on the total employment of higher education graduates, and their employment by field of formal training in different sectors of Soviet industry, were not officially released; recourse was made to fragmentary releases and estimating procedures which were made in the course of the preparation of this study. They are not reproduced here and the new official data have been used instead. Such data were compiled annually by Soviet statistical agencies, but they were released to the public for the first time in 1960.[86] Table VI–54 presents data on the total number of professionals, the total number of professional engineers, and the number of such engineers by formal training specialty in various sectors of Soviet industry as of December 1959. The data refer to professionals engaged in all activities in industrial enterprises—*ETMP*, office employees and production workers.

The grand total of professionals of all types employed in intra-unit positions in Soviet indus-

[85] Note that prior to the mid-1950's the building materials, printing and wood products sectors were above or at par with the all-industry ratio. The light industry and foods sectors have always been well below the all-industry ratio.

[86] *NarKhoz–1960*, pp. 606–07.

TABLE VI–54.—*Employment of Soviet professionals by industry sector as of December 1, 1959*

[In thousands]

Industry sector	Total professionals in all fields	Professional engineers	Professional engineers by formal training specialty							
			Geology and mining (0100, 0200)[b]	Power, radio and communications (0300, 0600, 0700)	Metallurgy and machine building (0400, 0500)	Chemical technology (0800, 0900)	Food and consumer goods technology (1000, 1100)	Construction (1200)	Accounted total	Other engineering specialties, unspecified
Grand total	443.0	343.3	33.5	41.1	146.5	36.2	36.5	12.2	306.0	37.3
Ferrous metallurgy[a]	30.5	26.4	3.7	3.0	14.5	2.7	.1	.8	24.8	1.6
Nonferrous metallurgy[a]	13.3	11.4	4.3	1.3	4.0	.9	.05	.4	10.9	.5
Coal	22.4	20.4	16.1	3.7	.1	.1	.0	.1	20.1	1.3
Petroleum extracting	5.0	4.5	3.7	.2	.3	.1	.0	.1	4.4	.1
Petroleum processing	4.7	4.0	.1	.3	.7	2.7	.0	.1	3.9	.1
Electrical and thermal power	12.3	11.1	.0	9.0	.6	.3	.1	.3	10.3	.8
Metal processing and machine building	197.9	158.9	1.1	18.1	110.7	8.7	1.8	3.6	144.0	14.9
Chemical	30.2	22.2	.5	1.4	4.2	12.4	1.7	.7	20.9	1.3
(of which, rubber and asbestos)	(4.1)	(3.1)	(.0)	(.2)	(.7)	(1.6)	(.1)	(.0)	(2.6)	(.5)
Timbering, paper and wood products	20.3	15.4	.1	.6	1.3	.2	.2	.5	2.9	12.5
Building materials	18.5	14.7	1.6	.8	2.0	5.1	.3	3.7	13.5	1.2
Textiles	16.6	11.8	.0	.8	.7	.2	9.6	.2	11.5	.3
Garment	3.9	1.8	.0	.0	.1	.0	1.5	.0	1.6	.2
Leather, fur and footwear	5.3	3.4	.0	.1	.4	.2	2.4	.1	3.2	.2
Food	35.5	22.5	.1	.6	3.7	.7	15.6	.5	21.2	.3
Accounted total	416.4	328.5	31.3	39.9	143.3	34.3	33.3	11.1	293.2	35.3
Residual	26.6	14.8	2.2	1.2	3.2	1.9	3.2	1.1	12.8	2.0

[a] Including ore mining.

[b] For specialty code number, see appendix IV–B–1.

Source: *NarKhoz–1960*, p. 606.

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TABLE VI–55.—*Number and distribution of professionals and of professional engineers by industry sector in the U.S.S.R as of December 1959*

Industry sector	Professionals in all fields		Professional engineers	
	Thousands	Percent	Thousands	Percent
Grand total	443.0	100.0	343.3	100.0
Ferrous metallurgy	30.5	6.8	26.4	7.7
Nonferrous metallurgy	13.3	3.0	11.4	3.3
Coal	22.4	5.1	20.4	5.9
Petroleum extracting	5.0	1.1	4.5	1.3
Petroleum processing	4.7	1.1	4.0	1.2
Electrical and thermal power	12.3	2.8	11.1	3.2
Metal processing and machine building	197.9	44.7	158.9	46.3
Chemical	30.2	6.8	22.2	6.5
(Of which, rubber and asbestos)	(4.1)	(.9)	(3.1)	(.9)
Timbering, paper and wood products	20.3	4.6	15.4	4.5
Building materials	18.5	4.2	14.7	4.3
Textiles	16.6	3.7	11.8	3.4
Garment	3.9	.9	1.8	.5
Leather, fur and footwear	5.3	1.2	3.4	1.6
Food	35.5	8.0	22.5	6.6
Accounted total	416.4	94.0	328.5	95.7
Residual	26.6	6.0	14.8	4.3

Source: Table VI–54. Percentages computed.

trial enterprises was 443,000. The number of these professionals who were engineers by training was 343,000, or 77 percent of the total number of professionals employed in industry. The composition of the other 100,000 professionals employed in industrial enterprises was not officially stated, but there probably were planning specialists, university graduates and other-field specialists in the group. The significant finding, however, is that the overwhelming majority of professionals employed in industrial enterprises in 1959 were engineers by training.[87]

The number and distribution of professionals and of professional engineers by industry sectors in December 1959 are presented in table VI–55. Most notable are the high proportions of professionals trained in all fields (44.7 percent) and of professional engineers (46.3 percent) who are employed in the metal processing and machine building sector of Soviet industry. When the Soviet distributions are compared with similar American data for 1959,[88] the broad diversity of industry sectors employing engineers in the United States is in sharp contrast to the concentration of engineering manpower in the metal processing and machine building sector of Soviet industry.

The official Soviet data released in 1960 also enable us for the first time to ascertain the composition of engineers employed in industry by formal field of specialized training. These

TABLE VI–56.—*Number and distribution of professional engineers employed in Soviet industry, by formal training specialty, December 1959*

Professional training specialty	Number (thousands)	Percent
Grand total	343.3	100.0
Geology and mining (0100, 0200)	33.5	9.8
Power, radio and communications (0300, 0600, 0700)	41.1	12.0
Metallurgy and machine building (0400, 0500)	146.5	42.6
Chemical technology (0800, 0900)	36.2	10.5
Food and consumer goods technology (1000, 1100)	36.5	10.6
Construction (1200)	12.2	3.6
Accounted total	306.0	89.1
Residual, other engineering specialties, unspecified	37.3	10.9

Source: Table VI–54.

[87] Note that this supports the assumption made earlier, i.e., that the majority of professionals employed in industry were engineers by formal training.

[88] National Science Foundation, *Scientific and Technical Personnel in American Industry*, Report on a 1959 Survey, Washington, D.C.: U.S. Government Printing Office, 1960, p. 15.

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data are summarized in table VI–56. Again we note that 42.6 percent of all engineers employed in Soviet industry were originally trained in metallurgy and machine building. None of the other specialized fields accounted for more than 12 percent of the total number of professional engineers employed in Soviet industry in December 1959.

Total Employment of Semiprofessionals and Employment of Engineering and Industrial Technicians by Sector of Industry in 1959

Table VI–57 presents official information on the total number of semiprofessionals employed in Soviet industry and on the number of these who were engineering and industrial technicians, by

TABLE VI–57.—*Employment of Soviet semiprofessionals by industry sector as of December 1, 1959*

[In thousands]

Industry sector	Total semiprofessionals in all fields	Engineering and industrial technicians	Engineering and industrial technicians by formal training specialty							
			Geology and mining (0100, 0200)[b]	Power, radio and communications (0300, 0600, 0700)	Metallurgy and machine building (0400, 0500)	Chemical technology (0800, 0900)	Food and consumer goods technology (1000, 1100)	Construction (1200)	Accounted total	Other engineering specialties, unspecified
Grand total	1,025.3	860.9	70.7	120.2	366.2	56.9	115.6	47.4	777.0	83.9
Ferrous metallurgy[a]	54.7	47.6	5.7	8.5	22.8	5.1	.2	2.7	45.0	2.6
Nonferrous metallurgy[a]	29.9	25.7	8.5	5.2	7.4	1.8	.1	1.3	24.3	1.4
Coal	59.4	51.3	35.9	13.1	.5	.2	.1	.8	50.6	.7
Petroleum extracting	7.3	6.3	4.0	.5	.9	.2	.0	.3	5.9	.4
Petroleum processing	10.2	8.9	.2	1.0	2.6	4.3	.1	.3	8.5	.4
Electrical and thermal power	25.5	23.1	.3	17.9	1.5	.5	.2	1.0	21.4	1.7
Metal processing and machine building	432.7	390.3	3.9	49.4	281.3	9.6	4.2	14.3	362.7	27.6
Chemical	54.8	45.4	1.3	5.7	11.3	20.4	2.3	2.0	43.0	2.4
(Of which, rubber and asbestos)	(7.3)	(6.2)	(.0)	(.5)	(1.5)	(3.4)	(.3)	(.2)	(5.9)	(.3)
Timbering, paper and wood products	59.0	4.4	.3	3.7	5.3	.3	.5	4.5	14.6	29.8
Building materials	49.5	41.4	3.5	3.5	7.1	10.8	1.6	11.8	38.3	3.1
Textiles	58.7	43.9	.3	3.1	4.9	.3	32.9	1.6	43.1	.8
Garment	19.2	13.9	.1	.2	1.2	.1	11.6	.3	13.5	.4
Leather, fur and footwear	15.4	12.1	.0	.5	1.6	.2	9.0	.4	11.7	.4
Food	82.7	63.0	.3	3.6	9.8	.7	40.6	2.2	57.2	5.8
Accounted total	959.0	817.3	64.3	115.9	358.2	54.5	103.4	43.5	739.8	77.5
Residual	66.3	43.6	6.4	4.3	8.0	2.4	12.2	3.9	37.2	6.4

[a] Including ore mining.
[b] For specialty code number, see appendix III–B–1.
Source: *NarKhoz–1960*, p. 607.

formal training specialty, as of December 1959. Of the total 1,025,300 semiprofessionals employed in the various industry sectors, 860,900, or about 70 percent, were engineering or industrial technicians by training.

Table VI–58 presents information on the total number and distribution of semiprofessionals and of engineering and industrial technicians employed in various sectors of Soviet industry as of December 1959. As with professionals and engineers (table VI–55 above), there was a heavy concentration of semiprofessionals trained in all fields (42.2 percent) and of engineering and industrial technicians (45.3 percent) in the metal processing and machine building sector of Soviet industry.

As indicated by the data in table VI–59, 42.5 percent of the semiprofessional engineering and industrial technicians employed in Soviet industry had been trained in metallurgy and machine

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TABLE VI–58.—*Number and distribution of semiprofessionals and of engineering and industrial technicians by industry sector as of December 1959*

Industry sector	Semiprofessionals in all fields		Engineering and industrial technicians	
	Thousands	Percent	Thousands	Percent
Grand total	1,025.3	100.0	860.9	100.0
Ferrous metallurgy	54.7	5.3	47.6	5.5
Nonferrous metallurgy	29.9	2.9	25.7	3.0
Coal	59.4	5.8	51.3	6.0
Petroleum extracting	7.3	.7	6.3	.7
Petroleum processing	10.2	1.0	8.9	1.0
Electrical and thermal power	25.5	2.5	23.1	2.7
Metal processing and machine building	432.7	42.2	390.3	45.3
Chemical	54.8	5.3	45.4	5.3
(Of which, rubber and asbestos)	(7.3)	(.7)	(6.2)	(.7)
Timbering, paper and wood products	59.0	5.8	44.4	5.2
Building materials	49.5	4.8	41.4	4.8
Textiles	58.7	5.7	43.9	5.1
Garment	19.2	1.9	13.9	1.6
Leather, fur and footwear	15.4	1.5	12.1	1.4
Food	82.7	8.1	63.0	7.3
Accounted total	959.0	93.5	817.3	94.9
Residual	66.3	6.5	43.6	5.1

Source: Table VI–57. Percentages computed.

building specialties. The proportion of technicians employed in Soviet industrial enterprises, either by industry sectors or by formal specialty training, closely resembles that for engineers discussed above.

Since the U.S.S.R. had a total number of 1,679,000 semiprofessionals trained as industrial technicians as of December 1959,[89] and by actual employment in industrial enterprises there were about 861,000 technicians in various fields, 51 percent of Soviet technicians by training were employed in industrial enterprises. The remainder were employed elsewhere in the economy. The percentage of technicians by training actually employed in Soviet industrial enterprises (51 percent) was higher than that of engineers with higher education so employed (34 percent).

TABLE VI–59.—*Number and distribution of semiprofessional engineering and industrial technicians employed in Soviet industry, by formal training specialty, December 1959*

Semiprofessional training specialty	Number (thousands)	Percent
Grand total	860.9	100.0
Geology and mining (0100, 0200)	70.7	8.2
Power, radio and communications (0300, 0600, 0700)	120.2	14.0
Metallurgy and machine building (0400, 0500)	366.2	42.5
Chemical technology (0800, 0900)	56.9	6.6
Food and consumer goods technology (1000, 1100)	115.6	13.4
Construction (1200)	47.4	5.5
Accounted total	777.0	90.2
Residual, other engineering specialties, unspecified	83.9	9.8

Source: Table VI–57.

Rates of Employment of Professionals and Semiprofessionals in Relation to Number of Production Workers in Soviet Industry

Data on the number of professional engineers and semiprofessional technicians employed in Soviet industry by sector will now be related to the number of production workers so employed. Table VI–60 makes these comparisons.

For Soviet industry at large the 1959 ratio of professional engineers per 1,000 production workers was 20, and of semiprofessional techni-

[89] Appendix table VI–C–5–SP.

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TABLE VI–60.—*Rates of employment of Soviet engineers and technicians per 1,000 production workers, by industry sector, December 1959*

Industry sector	Production workers	Professional engineers		Semiprofessional technicians	
	Thousands	Thousands	Ratio	Thousands	Ratio
Grand total	16,791	343.3	20.4	860.9	51.3
1. Metallurgy, ferrous and nonferrous	991	37.8	38.1	73.3	74.0
2. Fuels	1,326	28.9	21.8	66.5	50.1
3. Electric power	252	11.1	44.0	23.1	91.7
4. Chemical	537	22.2	38.7	45.4	84.5
5. Machine building, equipment manufacturing, and metal working	5,055	158.9	31.4	390.3	77.2
6. Forestry, wood products and paper	2,418	15.4	6.4	44.4	18.4
7. Building materials	1,007	14.7	14.7	41.4	41.4
9. Light industry	2,804	17.0	6.1	132.9	47.4
10. Food processing	1,713	22.5	13.1	63.0	36.8
Accounted total	16,103	328.5	20.4	817.3	50.7
8 and 11. Residual—other	688	14.8	21.5	43.6	63.4

Sources and Notes: Tables VI–54 and VI–57; *NarKhoz–1960*, p. 606. Employment of production workers by sector is estimated by applying the 1956 distribution of production workers by sector in percent (*NKh–1957*, p. 49) upon 1959 total (*NarKhoz–1960*, p. 138). *NarKhoz–1960*, p. 139, gives fragmentary figures for production workers for various sectors, which differ by less than 3 percent from the estimated figures above.

cians, 51. There was significant variation in the ratio among the various industry sectors, both for professional engineers and for semiprofessional technicians. For professional engineers the ratios were highest in three sectors: electric power (44), chemical industry (39), and metallurgy (38). At the other extreme, the light industry and forestry sectors accounted for only 6 professional engineers per 1,000 production workers, and the food processing sector employed only 13 professional engineers per 1,000 production workers.

Similar differences held true in the employment of semiprofessional technicians in relation to the number of production workers. Industry sectors with high rates of professional engineering employment also had high rates of employment of technicians in relation to production workers.

The number of technicians employed in all industry sectors combined was about 2½ times the number of engineers employed. In individual sectors, the ratio of technicians to engineers was highest in light industry (almost 8:1), forestry, and food processing; and lowest in metallurgy (less than 2:1), electric power and machine building. Such apportionments suggest that the consumer goods industries relied more heavily upon the services of semiprofessional technicians than did industrial sectors in heavy industry, where the services of professional engineers were in great demand.

Problem of Utilization: The Total Number of Soviet Graduates in Engineering-Industrial Fields by Specialty Group and Their Employment by Industry Sector

The Soviet data released recently enable us to trace further the employment pattern of graduates in the engineering-industrial fields. Table VI–61 presents information on the stock of higher education graduates in the engineering-industrial fields by the specialty group in which they were trained. The U.S.S.R. totals were derived by projecting the Russian SFSR distribution figures, as officially reported for 1957, upon the total number of engineering-industrial graduates employed in the U.S.S.R. as a whole.

The figures presented in table VI–61 refer to engineers who were trained, in theory at least, to assume employment in corresponding sectors of Soviet industry. In order to see how these figures actually relate to the intra-unit employment of engineers by specialty fields, the two

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TABLE VI–61.—*Number and distribution of professionals employed in engineering and other industrial fields by formal training specialty in the Russian SFSR, and U.S.S.R. estimates, 1957 and 1959*

Specialty group code	Specialty groups	Russian SFSR Dec. 1957		U.S.S.R. estimate Dec. 1957	U.S.S.R. estimate Dec. 1959
		Thousands	Percent	Thousands	Thousands
0100	Geology and exploration of mineral deposits	22.8	4.27	34.8	41.6
0200	Exploitation of mineral deposits	25.3	4.74	38.7	46.1
0300	Power engineering	39.4	7.39	60.3	71.9
0400	Metallurgy	27.2	5.09	41.5	49.5
0500	Machine building and instrument construction	147.4	27.61	225.3	268.8
0600	Electrical machine building and electrical instrument construction	27.1	5.07	41.4	49.4
0700	Radio engineering and communications	26.0	4.87	39.7	47.4
0800	Chemical technology engineering	43.1	8.07	65.9	78.6
0900	Timber engineering and technology of wood processing, cellulose, and paper manufacturing	17.3	3.24	26.4	31.5
1000	Technology of food products industry	17.5	3.28	26.8	31.9
1100	Technology of consumer goods industry	15.5	2.90	23.7	28.2
1200	Construction	77.0	14.42	117.8	140.4
1300	Geodesy and cartography	5.7	1.07	8.7	10.4
1400	Hydrology and meteorology	4.3	.81	6.6	7.9
1600	Transportation	38.3	7.17	58.5	69.8
	Total	533.9	100.00	816.0	973.4

Sources: *NarKhoz RSFSR—1959*, pp. 377, 386; *NarKhoz—1959*, p. 674. The U.S.S.R. composition and number by specialty field were estimated on the basis of the RSFSR distribution.

sets of data were matched and are presented in table VI-62.

The most striking result of these comparisons is that two-thirds of all Soviet engineers by training were employed, not in industrial enterprises, but elsewhere in the economy. The proportion of engineers working "elsewhere" varied by specialty field, the largest being those

TABLE VI–62.—*Number and proportion of engineers by training specialty employed in Soviet industry and elsewhere in the economy, 1959*

Professional training specialty	Total number of engineers trained	Actually employed by industrial enterprises		Number employed elsewhere in the economy	
	Thousands	Thousands	Percent	Thousands	Percent
Grand total	973.4	343.3	35.3	630.1	64.7
Geology and mining (0100, 0200)	87.7	33.5	38.2	54.2	61.8
Power, radio and communications (0300, 0600, 0700)	168.7	41.1	24.3	127.6	75.7
Metallurgy and machine building (0400, 0500)	318.3	146.5	46.0	171.8	54.0
Chemical technology (0800, 0900)	110.1	36.2	28.8	73.9	71.2
Food and consumer goods technology (1000, 1100)	60.1	36.5	60.7	23.6	39.3
Construction (1200)	[a]140.4	12.2	8.7	128.2	91.3
Accounted total	885.3	306.0	34.6	579.3	65.4
Residual, other engineering specialties, unspecified	[b]88.1	37.3	42.3	50.8	57.3

[a] A majority of these graduates were employed in construction, which is singled out as a separate branch of the economy.

[b] The majority of graduates in this group (69,000) were trained in transportation engineering, some of whom were employed in industrial enterprises, others in transportation, which is a separate branch of the economy.

Sources: Tables VI–60 and VI–61.

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trained as power, radio and communications engineers, and the smallest those trained in food and consumer goods technology. The largest proportion of engineers employed in industrial enterprises were those trained in food and consumer goods technology (61 percent), followed by metallurgy and machine building (46 percent). In all other specialties, over 60 percent of the engineers so trained were employed elsewhere in the economy.

What does "elsewhere" really mean? A certain number of engineers work in research and development outlets, which are separated administratively from industrial enterprises and other production units. A considerable number of engineering higher education graduates are probably employed in management in Soviet industry and the economy in general outside of industrial enterprises proper. Finally, some may be working in branches of the economy not related directly to industrial production, or research, or industry management.

Some data, for various dates prior to 1946 [90] indicate that intra-unit employment accounted for 45 to 55 percent of all professionals working in industry-related activities. The remaining 45 to 55 percent were employed in various administrations above the plant level, in industrial research and development institutes, in manpower training establishments, etc. Since 1946, however, similar figures have appeared only for 1954.[91] They indicated that 40 percent of the professionals in industry were employed in production directly, and the remainder in *intra*-unit management offices or all types of *extra*-unit outlets. In cannot be determined statistically if this situation has changed, but the fact that two-thirds of all Soviet engineers in 1959 were employed outside of industrial enterprises suggests that the earlier trends are continuing.

The frequent employment of graduate specialists, and particularly engineers, in administration and management has been a continuing source of criticism. A governmental decree of October 14, 1954, noted that:

> . . . having inflated the administrative staff, the ministries and administrations have diverted from production to office work a considerable number of specialists, which leads to damaging results . . .[92]

The reason sometimes given for the involvement of so many Soviet specialists in administration and management is the bureaucratic structure of Soviet industry. It was said of the coal industry, for example:

> The problem of the correct organizational structure of the [coal] industry is of utmost importance. We have now many stages in administration: mine section, mine, trust, main administration, republic ministry, all-union ministry. Each of these administrative links employs a large number of engineers whose true place is not there, but in production, where the coal is being mined—in the mines themselves. At the present time many of these engineers are not occupied with engineering but with creating paper work.[93]

Using specific figures, Khrushchev reported that in 1956 there were in the Donets Basin 11,980 engineers and 19,800 technicians (compared to 2,417 engineers and 2,624 technicians in 1940), but that "the proportion of these engineers and technicians employed directly in the mines was smaller in 1956 than in 1940." [94]

The 1957 reform of the management of Soviet industry was aimed, among other things, at improving the pattern of utilization of engineers. At that time, Khrushchev declared: "Above the enterprise level there is an apparatus of main administrations and ministries. This administrative hierarchy diverts a large number of specialists, engineers, technicians and economists, pulling them away from the sphere of material production." [95] Other statements echoed these remarks: "A large proportion of specialists, among them the most qualified, have been employed in the administrative apparatus of ministries and departments to the detriment of technological management of industrial enterprises proper." [96]

Regional economic councils were set up in 1957 to streamline the Soviet economic administration and free engineers and other specialists for jobs in production directly. But the reform has not seemed to affect significantly the admin-

[90] Beilin, *Kadry*, pp. 188, 223; *Itogi pervogo FYP*, p. 215; *Podgotovka*, p. 14; *SotsStroi—1935*, p. 526; *Plan Khoz*, No. 3, 1941, p. 21; *Partiinaia zhizn'*, No. 2, 1946, p. 16.

[91] *Kommunist*, No. 16, 1954, p. 30.

[92] *Direktivy-SBX*, vol. IV, p. 311.

[93] N. S. Khrushchev, speech at a conference of Donets Basin miners in Stalino, reported in *Trud*, Aug. 18, 1956.

[94] *Idem.*

[95] *Pravda*, May 8, 1957 (speech at the Supreme Soviet on the reorganization of industrial administration).

[96] Gubareva, *op. cit.*, p. 203.

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istrative structure of branches of industry on the regional level. "Multi-stage management" seems to have been retained, consisting of the industry branch regional administration, the trust (or combine), the enterprise, and the production shop. Above this level there are still vast central administrations, i.e., republic economic ministries, all-union state committees and, substantially expanded in size, the State Planning Committee (*Gosplan*). As in the past, articles continue to be published stating that sometimes not a single engineer can be found in production enterprises,[97] while many graduate engineers are working in all sorts of managerial positions outside the plants.

TABLE VI–63.—*Ratios of white-collar workers and ETMP per 1,000 production workers in selected branches of industry of the Perm' (Molotov) Region, 1956 and 1957*

	Industrial enterprises of regional economic councils		Industrial enterprises of local councils	
	1956*	1957**	1956*	1957**
All-industry	204	212	253	248
Machine-building and metal processing	221	225	213	205
Timbering	196	210	251	241
Wood processing	165	161	262	225
Production of construction materials	152	154	167	175
Coal mining	192	196	217	199
Footwear	218	216	164	180

* Pre-reorganization ** Post-reorganization

Source: V. V. Kondakov, "Promyshlennost' sovnarkhoza i mestnykh sovetov v ekonomicheskom administrativnom raione" (Industry of the Regional Economic Council and the Local Soviet in the Economic Administrative Region), in Akademiia Obshchestvennykh Nauk pri TsK KPSS, A. G. Kulikov (ed.), *Iz opyta raboty sovnarkhozov i razvitiia khoziaistva raionov*, p. 141.

The official Soviet claim is that the reorganization of industry, from ministerial to regional economic council jurisdiction, has improved the utilization of *ETMP*. But the fact is that intra-unit employment of white-collar workers and *ETMP* in relation to production workers has *not* been significantly affected by this reorganization. This is evidenced by detailed local data, for example, by the reported ratios of *ETMP* to production workers in Perm' province, as presented in table VI–63. In general, it may be said that no significant change has occurred in regard to the utilization of specialists as a result of the reorganization.[98]

The bureaucratic involvements encountered even by engineers employed directly in production have frequently been discussed in the Soviet press. The most burdensome diversion from proper use of work time appears to be occasioned by an "endless flow of paper work which prevents engineers from doing their job properly."[99] Worthless or "purposeless documentation" in various offices was said to run into thousands of items, consuming a great deal of the time of engineers, technicians and planners.

Planning Problem: Determination of Demand for ETMP and Professional Engineers in Soviet Industry

It is a major thesis of socialism and communism that economic activity, including all aspects of manpower requirements, should, and indeed can, be planned. This includes specialized personnel, and it is important, therefore, to raise the question whether specialized manpower in the U.S.S.R. is really planned, and if so, what the foundations of such planning are.

Planning efforts of the Soviet Government, designed to ascertain the demand for *ETMP* and the professional and semiprofessional component within it (primarily for large-scale or "census" industry), date back to the late 1920's. The critical need for *ETMP* with the advent of industrialization was pointed up also by political factors (particularly the well publicized "Shakhty trial" of 1928), which added to the drive to create in the shortest possible time new cadres of loyal "proletarian" specialists the dimension of political expediency. The looming shortage of qualified *ETMP*, it was feared, would become severe enough to handicap the development of the socialist economy.

The first exploratory approach to ascertain the demand for *ETMP* was made in connection with the development of the First Five-Year

[97] *Partiinaia zhizn'*, No. 12, June 1959, pp. 41–42. Specific reference was made to several plants in the Kherson region.

[98] See also *Komsomol'skaia pravda*, June 10, 1958; *Pravda Ukrainy*, Feb. 12, 1958.

[99] *Pravda Ukrainy*, Feb. 12, 1958.

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Plan, and estimates were presented at the Fifth Congress of the Soviets in May 1928. The projected demand for *ETMP* in several branches of large-scale industry only was estimated by comparing existing ratios of *ETMP* to total employment with "desired" ratios, which, with minor adjustments, were copied from foreign (German, French, Dutch, and American) employment practices.

This first undertaking was supported by directives announced at the July 1928 plenum of the Central Committee of the Communist Party. These directives somewhat arbitrarily proclaimed that the relative proportion of *ETMP* (i.e., percentage of *ETMP* of the total number of wage earners and salaried employees) should be doubled during the First Five-Year Plan, and that a ratio of one professional engineer to two or three semiprofessional technicians should be maintained in Soviet large-scale industry. The arbitrariness of this pronouncement stemmed from the fact that the quantitative magnitudes were derived, by and large, from comparisons of the employment in Russian and German industries, the data for the latter being largely obtained from the German census of manufacturing of 1925.[1] Prior to the July plenum, consideration of future demand for *ETMP* and specialized personnel had been excluded from the scheme of overall industrial planning.[2] It is true that some industrial trusts and economic administrations of the Supreme Economic Council (*VSNKh*) had compiled information concerning existing and projected requirements for engineers, technicians, and managerial personnel in individual plants and enterprises, but uniform methods of arriving at this information were lacking, and no attempts of aggregation on an industry-wide or nationwide scale had been made. Thus the July 1928 plenum, relying upon data compiled by economic administrations in connection with the proposed First Five-Year Plan, and upon crude attempts of aggregation made on the basis of these data by the State Planning Commission, announced a general policy for the "desired" overall requirements. The plenum duly noted that the planning of *ETMP* was most rudimentary and quite unsatisfactory. It decreed therefore that a more elaborate effort in this direction be undertaken in the course of the following year (i.e., 1928–29).

Thus followed the second attempt at *ETMP* planning, which may also be described as crude. The task was undertaken by the central organs of the Soviet Government–the State Planning Commission and, primarily, the Supreme Economic Council (*VSNKh*) and its division, the Chief Administration of Industrial Personnel (*Glavpromkadr*). The Supreme Economic Council generally used data collected during the earlier effort, and various of its economic administrations, with the trusts and individual plants under their jurisdiction, were not consulted.

The Supreme Economic Council assumed that the basic method of planning the requirements for *ETMP* in Soviet large-scale industry should be related to the technological development in individual plants. Accordingly, a selected list of plants was prepared, and grouped in the following manner: The first group included plants and industrial enterprises in which, according to the proposed First Five-Year Plan (apparently a minimal version of it), the existing production equipment remained relatively unchanged in the course of the planning period, and in which the planned increments of output were attributed largely to improvements in existing technology. The second group included plants which were subject to substantial reconstruction, i.e., the introduction of new equipment and major changes in production techniques. Finally, the third group of plants consisted of those units which were to be constructed or organized entirely anew.

The next step entailed the determination of major "productive segments"—the three vertical divisions (same, modified, or new plants) of engineering activity or business management. For each segment, the actual and the "desired" employment of *ETMP* were ascertained. The "desired" employment for the first group was based on the need for additional engineers in

[1] For specific examples of the difficulties encountered, see: Vysshyi Sovet Narodnogo Khoziaistva SSSR (Supreme Economic Council of the U.S.S.R.), *Piatiletnii plan inzhenerno-tekhnicheskikh i ekonomicheskikh kadrov v promyshlennosti. Chast' pervaia: plan potrebnosti* (Five-year Plan for Engineering-Technical and Economic Cadres in Industry. Part One: Estimate of the Demand), Moscow, 1930, pp. 45-48; *Plan kadrov*, pp. 14, 32.

[2] VSNKh, *Piatiletnii plan*, p. 3; see also the proceedings of the July 1928 plenum of the Central Committee and the resolutions of the 15th Communist Party conference.

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top management and additional engineers and technicians in industrial laboratories, planning divisions, repair shops and power plants. For the second group, large increases in the force of engineers and technicians at the shop level, in addition to meeting the requirements of the first group, were considered the fundamental factor in calculating "desired" employment. Finally, for purposes of ascertaining "desired" employment in the third group, the existing pattern of employment of *ETMP* in American and German industry in the mid-1920's was taken as a basic precept.

This done, the "desired" employment and actual employment of *ETMP* were aggregated and related to the total employment of wage earners and salaried employees. Then coefficients of actual and "desired" *ETMP* employment were constructed, which reflected the current demand for *ETMP*. In order to make future projections, the coefficient for "desired" employment was manipulated in such a way as to jibe with the two major policy goals, i.e., doubling the employment ratio for *ETMP* and maintaining the ratio of engineers to technicians at 1 to 2 or 3. This latter procedure led to calculations of the future demand for *ETMP*. There were no checks upon the validity of these procedures and the numerical magnitudes derived. The entire process relied exclusively upon a hypothetically constructed "desired" pattern of employment of *ETMP*. The only element of realism in this entire venture was the fact that the "desired" *ETMP* and specialist ratios were those actually used in foreign employment practice. The question of relevance of foreign staffing norms indigenous to technology and business practice in Germany or America to Soviet conditions was not considered.

Despite the numerous shortcomings and the admitted arbitrariness of the methods used for ascertaining the future demand for *ETMP*, the findings and quantitative magnitudes derived as a result of these projections were tentatively accepted by the Council of People's Commissars (*Sovnarkom*) in the summer of 1929.

In the fall of 1929 the People's Commissariat of Agriculture (*Narkomzem*) made an attempt to survey the available supply of agricultural specialists and to compute the current demand as well as the projected requirements for specialized personnel in the socialized segment of Soviet agriculture. The *Narkomzem* proceeded from the basic assumption that state farms (*sovkhozy*) would become the predominant types of producing units in the socialized segment of agriculture. Furthermore, *Narkomzem* worked out a tentative schedule of staffing for a typical collective farm. Future demand for agricultural specialists was estimated on the basis of these hypothetically constructed units.

In the fall of 1929 the State Planning Commission also undertook the processing of the estimated requirements for specialized personnel for agriculture, as well as of the data derived from the second attempt to establish the projected demand for *ETMP* in industry. This joint planning effort, based on the two earlier projects, was presented to the plenum of the Central Committee of the Communist Party in November 1929. It was bitterly condemned. This plenum adopted a resolution which stated that "the work in securing managerial and specialized personnel [for industry and socialized agriculture] is utterly unsatisfactory and still continues without adequately and firmly justified plans, without reliable estimates of the future requirements and consideration of the possibilities for their satisfaction."[3] It was therefore decreed that a new attempt be made at once. The Supreme Economic Council started working on the new project in December 1929, and the State Planning Commission was ordered to work out an integrated nationwide plan of future requirements.

Whatever became of this effort remains a mystery, for no final report was ever published. While for the next two decades the talk continued of the "correct" engineer-technician ratio, there was no mention of how an industry-wide ratio of *ETMP* to production workers or to total employment should be used for long-run predictions of demand. But as late as 1948, these planning efforts of the late 1920's were called "the only attempt made to approach the problem of estimating the demand for cadres of specialists. . . ."[4]

The initial efforts at estimating a national or industry-wide demand for *ETMP* and specialists gave way in the 1930's to another approach.

[3] VSNKh, *Piatiletnii plan*, p. 4.
[4] Liasnikov, *VVSh*, No. 4, Apr. 1948, p. 18.

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Various "standard" or model (*tipovye*) staffs for enterprises were constructed piecemeal and "approved" by scores of Soviet administrative agencies. The planning technique of defining "normal" or model staff thus came into play as the major tool for determining the demand for *ETMP*. "Normal" staffs were established for separate shops, plants, bureaus, sections, enterprises, etc. according to the job designation (*dolzhnostnomu priznaku*) for each year of any given planning period. The expectation was that the *ETMP* staff, and the professional and semiprofessional jobs within it, could be modeled on the "best plants" and that other plants with similar needs could adopt them. The blunders which resulted from the imitations were the result not so much of the voluntary action of the enterprises themselves but of the official policy to place individual enterprises in a certain model staffing category. "Normal" staffs were related to total employment, which gave a proportional coefficient of employment of *ETMP,* engineers and technicians. In order to project the demand for *ETMP* and specialists by industry sector or for the economy at large, these coefficients were extrapolated and, after conversion back to an absolute number of specialists of a given type, served as the basis for estimating the future total demand for specialized manpower.

This is the practice which has been in existence now for nearly 30 years. A Soviet economics textbook states: "The method of planning the number of *ETMP* [and white-collar workers] is based on the standard tables of administrative organization of shops and enterprises, in accordance with which all staff positions are determined, the exact number of personnel in each staff indicated, and the corresponding salaries for each position set." [5]

Even in the most recent efforts to forecast the future demand for specialized manpower,[6] the staff method is still considered the backbone of the estimating technique.[7]

The Soviet planning procedure continues to be hinged on "staff" calculations, which is in effect a form of direct physical allocation technique applied to specialized manpower. In recent years and within the confines of this allocation scheme, the Soviet planners have sought more refined methods for long-run projections of demand conditions. The refinements consist of using, in the correlation of *ETMP* and specialist ratios, not only the total number of production workers but also other economic and technological variables.

One suggestion was to estimate the long-run demand for *ETMP* and professionals in relationship to the projected growth of the gross value of output.[8] Another was to relate *ETMP* requirements to "technology," expressed in terms of capital stock or electric power input.[9] Whatever refinements are suggested, however, they have all related, either actually or ideally, to a model staff.

Numerous Soviet sources have described *how* the staff of *ETMP* should be determined.[10] They have presented elaborate diagrams, charts, "normal" staffing schedules, normative coefficients of *ETMP* employment and complicated tabulations of hypothetical staffs by level and type of education. This study cannot venture into a detailed description of these staffing procedures, but it will address itself to the main problems in the application of the general method.

First, the Soviet staffing technique gives rise to the question of why a certain *ETMP* position should be filled by a certain type of specialist. Why should the "director" of a brick yard be an "engineer in silicate technology," or the "norm setter" in a coal mine an "economist," and the "shift dispatcher" in a blast furnace shop an "engineering economist in ferrous met-

[5] I. F. Gofman *et al., Organizatsiia i planirovanie energokhoziaistva promyshlennykh predpriiatii* (Organization and Planning of Power Enterprises), Moscow, 1954, p. 389.

[6] Komarov, *Ekonomicheskie osnovy*, esp. pp. 83-107.

[7] See, esp., V. Kostakov and P. Litviakov, "Printsipy opredeleniia potrebnosti v spetsialistakh" (Principles of the Determination of the Demand for Specialists), *Sotsialisticheskii trud*, No. 8, 1959, pp. 19-27.

[8] Nozhko, *op. cit.*, 16. His approach is essentially the same as that used in some Western countries where the estimates of future requirements of engineers and technicians are based on the growth of industrial output: if industrial output is to increase by 4 percent annually, the demand for engineers should likewise increase at the same rate, or at some constant factor related to it.

[9] Komarov, *Plan Khoz*, No. 9, 1957, p. 58. The estimating procedure was based essentially on a coefficient of *ETMP*, engineers or technicians per capital stock in a given industry sector. The demand for engineers or *ETMP* would increase in a constant proportion to the growth of the capital stock. The same procedure was applied to electric power input.

[10] One of the most comprehensive explanations of the staff determination procedures is given in Liasnikov, *Podgotovka, passim.*

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allurgy"? According to hypothetical job descriptions and staffing tables, these positions should be filled by *trained* specialists. Why? Over the years such jobs may well have been filled by practicals who came up from the ranks. But "model" staffing tables specify that these positions should be filled by trained specialists. This in itself is enough to create an additional demand for trained specialists. Will production in a brick yard, in a mine, or in a blast furnace shop be hampered if these positions are not filled by "trained specialists"?

It may well be that in some instances the planners' job specifications may be justified on the basis of prevailing practice, but in others they may be utterly arbitrary "desires" of an ambitious planner. In order to pass sound judgment on the rationality of Soviet staffing practices, we would need much more detailed information than we have now on the nature of the functions to be performed by the holders of the thousands of *ETMP* positions.

Another major difficulty is the static nature of the Soviet planning procedures. The "model staffing" procedure for each enterprise or group of enterprises permits the determination of the requirements for specialists only for a given moment. The planners themselves recognize that the staffing method is based on *ex post* conditions: "Positions to be filled by specialists with higher or secondary education are defined on the basis of staff schedules many years old, which do not take into account changing technological or managerial conditions of production."[11] The demand is determined from the "present staff structure and existing job classifications." Therefore, such a procedure is not readily suited to forecasting the future demand for specialists. Indeed, the first step toward a technique of determining future demand would be the abandonment of the very notion of "standard." By means of adjustments and extrapolations related to the changing volume of industrial production, employment, size of plant, technology and other factors, the original staffs could be altered in one way or another. Such procedure would of course make the staffing tables non-"standard." There is an inherent contradiction in the staff method for estimating future demand: the original staffing scheme must of necessity be altered in order to make it applicable to the future.

The major difficulty with the staff method is that it does not take into consideration the major factors accounting for the empirically observed differentials in *ETMP* ratios in particular industry sectors. The demand for *ETMP* and for the professionals and semiprofessionals employed on various jobs within it varies in relation to diverse factors, such as: (a) the number of production workers; (b) the complexity and degree of fabrication of the product manufactured by a given plant, or its shops; (c) engineering and technological aspects of production (mechanization, automation, etc.); (d) the role of research in developing products or processes; (e) product testing (quality control) requirements; (f) organizational structure of the individual plant or its divisions; (g) the requirement for a managerial staff for *extra*-unit relations. In addition to these factors, which could individually or in combination influence the size of *ETMP* staff required, there is also the consideration that each manufacturing unit would have its own conditions which would not likely be identical to those of any other unit. Consequently, while Soviet planners repeatedly talk about "model" staffing schedules as the basis for planning the requirements for specialists, the real factors of demand continually force the *actual* staffing structures to shift away from the original ones. In the early 1930's, when the "standard" staffing idea was just beginning to be introduced, Soviet plant managers had considerable freedom in the hiring of specialists, but in the following two decades several thousand "standard" staffing schedules were developed and strictly enforced in some 800,000 plants, enterprises, administrations, offices, teaching establishments, and research institutes. Small units tried to imitate the larger ones. There were occasional "freezes" on staffs, followed by periods of relaxation when restaffing was undertaken under revised "standard" staffing schedules.

It should be noted, however, that even during this period some of the key plants were often able to by-pass, with the approval of their re-

[11] Gosplan SSSR, Nauchno-Issledovatel'skii Ekonomicheskii Institut (Research Institute of Economics), B. I. Braginskii (ed.), *Planirovanie potrobnosti narodnogo khoziaistva v spetsialistakh* (Planning of Requirements for the National Economy in Specialized Personnel), Moscow, 1959, p. 63.

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spective ministries, strict adherence to the "standard" staffing schedules which had proved to be unworkable. This made for imbalances and great disparity in the employment of specialists by individual plants and branches of industry. Still, the concept of "standard" staffing schedules was maintained.

In 1954 a general revision of most staffing schedules (which, it should be remembered, had come into existence in the late 1930's) was decreed. This process has continued, and a variety of revisions, including reductions in staffs of specialists in shops, enterprises, administrations, and ministries, have been announced. Plant and enterprise directors have been permitted to follow the "standard" staffing procedure with greater flexibility. In 1957, in fact, ministries and heads of departments were granted the right to decide the number of administrative and supervisory personnel in enterprises and offices. For a while there was even talk that no registration of such staffs would be required.[12]

Job specifications have also come in for attention, and between 1954 and 1956, apparently on the basis of a governmental decree of August 30, 1954,[13] the entire roster of job specifications for specialists was reviewed by the State Planning Commission, the Ministry of Higher Education, and the industrial ministries. The projected requirements for specialists for the periods 1956–60 and 1961–65 were apparently based on this review, which reflected a recognition of actual employment practices and an attempt to bring staffing policies up to date. After three decades of "planning," this latest effort was termed as "permitting *for the first time* the obtaining of complete information concerning the demand for specialists in the economy of the entire country."[14]

Why do the Soviet authorities need to know rather precisely how many *ETMP*, and particularly how many professional engineers within it, will be required at any given time? As pointed out in chapters III and IV, higher and secondary semiprofessional education in the Soviet Union is highly specialized. Admission to each specialized field is based on a rigid quota system whereby a given specialty admits a certain number of students each year because several years thereafter a specific number of engineers with a given specialty will be needed by the plants and enterprises of a given industry sector. The crux of the matter is that education in the Soviet Union, and particularly higher education, is rationed according to the decisions of the planners regarding future demand for specialists 5, 10, or 15 years hence. That the planning technique is inefficient is evidenced by the fact that there are shortages of specialists of some types (electronics engineers, for example) and an oversupply of others (geologists and mining engineers). In 1957 the demand for engineers was met by that year's professional graduates by the following percentages:[15]

Geology and mining explorations	163
Exploitation of mines	113
Hydrogeology and meteorology	108
Consumer goods	90
Food processing	82
Lumbering, wood processing and paper	84
Power engineering	59
Metallurgy	94
Construction	50
Electrical machine building and electronics	49

These rates of "satisfaction of demand" for engineers in 1957 indicate that many of the admission quotas in higher education set in 1951 and 1952 were based on faulty anticipation of demand. Obviously, it would be difficult to plan *ETMP* requirements for engineers in industry when two-thirds of all engineers are not even employed in industry. (See table VI–61.)

Despite the increased flexibility introduced since the scuttling of the Sixth Five-Year Plan, comments like the following continue to appear:

> The planning organs still do not have at the present time [1958] scientifically based methodology for estimating the demand for specialists either for the national economy as a whole or for its individual branches. There is no methodology which allows [us] to take into consideration the most significant factors influencing increases or decreases in the demand for specialists in relation to the further growth of socialist production and the development of science, culture, and technical progress.[16]

[12] *Sotsialisticheskii trud*, No. 3, 1957, p. 127.

[13] "Concerning the Improvement of Training, Job Assignment, and Utilization of Specialists with Higher and Secondary Specialized Education."

[14] Nozhko, *op. cit.*, p. 11 (emphasis added).

[15] Komarov, *Ekonomicheskie osnovy . . .*, pp. 84-85.

[16] G. S. Anodin, *Opredelenie potrebnosti v spetsialistakh v promyshlennosti: iz opyta ugol'noi promyshlennosti* (Determination of Demand for Specialists in Industry: On the Basis of Experience in the Coal Industry), Moscow, 1959, pp. 6-7.

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Khrushchev himself declared at the plenum on automation in July 1959:

> We do not have any scientifically reliable method of estimating how many and what kind of specialists we need in different branches of the national economy, what the future demand will be for a certain kind of specialist, and when such a demand will arise.[17]

Leading Personnel, ETMP and Specialists in Construction Enterprises

Table VI–64 presents data on the total employment, the number of *ETMP*, and their ratio to the number of production workers in Soviet construction enterprises for selected years.

TABLE VI–64.—*Total employment, number of ETMP, and their ratio to the number of production workers in Soviet construction enterprises, selected years*

Types of employment		Average annual employment in thousands						
		1928	1932	1940	1956	1957	1958	1959
All employees	T.	723	3,126	2,510	5,159	5,496	5,904	6,208
	C.	723	2,289	1,563	3,550	4,000	4,369	4,800
Production workers	T.	630	2,479	1,929	4,430	4,713	5,072	5,365
	C.	630	1,891	1,278	3,120	3,510	3,857	4,238
ETMP	T.	23	156	197	336	358	391	422
	C.	23	114	108	247	280	306	355
White-collar (office) employees	T.	28	231	208	228	231	240	250
	C.	28	168	81	110	122	125	136
Percent of *ETMP* among all employees	T.	3.2	5.0	7.8	6.5	6.5	6.6	6.7
	C.	3.2	5.0	6.9	6.9	7.0	7.0	7.4
Percent of *ETMP* and white-collar employees among all employees	T.	7.1	12.4	16.1	10.9	10.7	10.7	9.3
	C.	7.1	12.3	12.1	10.1	10.0	9.9	9.7
Ratio of *ETMP* per 1,000 production workers	T.	36.5	62.9	102.1	75.8	75.9	77.1	77.8
	C.	36.5	60.3	85.2	79.1	79.8	79.3	83.8

T.—Total number in each of the respective categories includes those who are employed in maintenance-repair organizations, transportation and machine shops which serve the construction industry, and employees of collective farm organizations, engaged in construction. Employment data (for the T rows) of this type are the first postwar releases of such figures.

C.—Construction-assembly work force, exclusive of the above mentioned organizations.

Sources: *NarKhoz—1959*, p. 648; *NarKhoz—1960*, p. 578.

As indicated in table VI–61, the number of professionals trained in construction engineering specialties in 1957 was 117,800. If we assume that the majority of professionals employed in construction (62,000)[18] were construction engineers by training, then at least 55,800 of these specialists were employed in *extra*-unit jobs elsewhere in the economy—in government, management, project design institutes, surveying, planning organizations, etc.

In 1959, the total number of higher education graduates employed in Soviet construction enterprises was 82,000.[19] We do not know how many of these were engineers by training. The aggregate number of professionals trained in construction engineering specialties in 1959 was estimated to be 140,400 (table VI–61). The number of these actually employed in Soviet industry was 12,200 (table VI–62). Again, if we assume that the majority of professionals employed in construction were construction engineers, then at least 58,000 of these specialists were employed outside construction (of which 12,200 worked in industry and the remaining 46,000, elsewhere in the economy).

Table VI–65 reveals an interesting pattern in the employment of women among leading personnel in Soviet construction enterprises. While women accounted for 30 percent of the total number of employees in construction (table VI–49) in 1957, they accounted for only 22 percent of all leading administrative, managerial and specialized personnel. And among the top-echelon jobs, i.e., heads of construction enterprises and chief engineers, their share was only

[17] *Pravda*, July 2, 1959.
[18] Appendix table VI–C–3–P.
[19] Appendix table VI–C–5–P.

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TABLE VI–65.—*Leading administrative, managerial and specialized personnel in Soviet construction enterprises by occupation and sex as of Jan. 1, 1957* *

Occupations	Total personnel		Employment of women		
	Thousands	Percent	Thousands	Percent	Percent of total
Heads of construction enterprises, chief engineers and other leading specialists and their deputies	5.0	1.4	.5	.7	1
Heads of divisions, offices and other structural subdivisions of construction enterprises and their deputies	25.0	7.6	3.5	4.8	14
Heads of subordinate (nonindependent) construction and construction assembly sections, job supervisors, heads of auxiliary production units and shops and their deputies	70.0	21.2	2.1	2.9	3
Heads of laboratories and norm (standard) setting and testing stations	1.3	.4	.8	1.1	60
Engineers, without administrative functions[a]	42.6	12.9	13.2	18.2	31
Technicians, without administrative functions[a]	21.8	6.6	9.6	13.2	44
Construction foremen	71.0	21.5	13.5	18.6	19
Expediters and dispatchers	1.0	.3	.3	.4	30
Chief accountants and head bookkeepers	28.8	8.7	11.8	16.2	41
Engineer-economists, economists and planning specialists	11.1	3.4	7.5	10.3	67
Subtotal	277.6	84.0	62.8	86.4	23
Other unspecified construction personnel	52.8	16.0	9.9	13.6	19
Grand total	330.4	100.0	72.7	100.0	22
Professionals with completed higher education in the grand total	54.0	16.2	.....	.....	.....
Semiprofessionals with secondary specialized education in the grand total	89.0	26.9	.....	.....	.....
Practicals without specialized education	189.4	56.9	.....	.....	.....

* Excluding employment in auxiliary enterprises preparing and transporting construction materials not at construction sites proper.

[a] Refers largely to specialists with completed higher or secondary specialized education, but not exclusively limited to persons with such education.

Sources: *Zhenshhcina*, p. 48. All data on leading personnel and women are from this source. Professionals and semiprofessionals: figures from appendix tables VI–C–2–P and VI–C–2–SP.

1 percent. Among the heads of construction units and job superintendents, their share was only 3 percent. It is obvious that their career advancement is even more constrained in construction enterprises than in Soviet industry as a whole.

Leading Administrative Personnel and the Employment of Specialists in Transportation and Communication

The data in table VI–42 revealed the following relationships between leading personnel and the employment of specialists in Soviet transportation and communication[20] in January 1957:

Transportation and communication,	*Total employment*	*Leading personnel*	*Higher education graduates*
total	5,840,000	576,000	54,000
Transportation	5,216,000	424,000	—
Communication	624,000	152,000	—

The proportion of higher education graduates among all leading personnel in this branch of the Soviet economy was thus 9.4 percent.

As indicated in table VI–61, the number of professionals trained for transportation and communication as of December 1957 was 98,200 (Specialty 0700—39.7; Specialty 1600—58.5 thousand), and the total number of professionals employed in transportation and communication at that time was 54,000,[21] leaving some 44,000 transportation and communication specialists working elsewhere in the economy (some in industry). Although Soviet authorities do

[20] Including wire and radio communications, telephone services and all postal services.

[21] Appendix table VI–C–2–P.

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compile data on *ETMP* and leading personnel in transportation and communication jobs, the relevant statistics for recent years, except for the totals in table VI–42, were not found in the primary sources examined.

Soviet officials have talked of cutting down the size of staffs in the top management and administration of railroads.[22] It was reported that the staffs of the Ministry of Railroad Transport were reduced by as much as 30 percent between 1954 and 1957. Among the ministerial staff, 75.2 percent of the leading personnel were said to have completed higher education.[23] In the lower echelons of administration and among supervisory operating personnel, on the other hand, the proportion of graduate specialists was extremely low. Again, as in industry in recent years, a drive has been on to shift more graduate specialists into low-echelon jobs.

Leading Managerial and Specialized Personnel Employed in Soviet Agriculture

Soviet reporting of agricultural employment is divided into several components. Two of these are: (1) state farms and auxiliary agricultural enterprises (the latter of which also serve collective farms); (2) machine-tractor stations (most of which were independent units prior to 1958 and are now for the most part merged with collective farms) and repair and maintenance stations (which continue to operate as independent units). All employees of these two types of agricultural enterprises are reported in the category of workers and employees for the economy at large. There is a third category of reporting, however—collective farmers, who represent the great mass of the Soviet peasants engaged in agriculture.[24]

The total agricultural employment must be arrived at by adding the totals of these three categories, since an aggregate figure is not reported. In 1959 state farms and auxiliary agricultural enterprises (category 1) and machine tractor and repair stations (category 2) together employed 5,855,000 persons.[25] But the third category presents a problem, for figures on the number of collective farmers are not officially released and must therefore be estimated. These estimates for recent years have ranged between 35 and 44 million, expressed in conventional man-years (see discussion in sources and notes to table VI–33), with the actual figure probably somewhere in the middle of these two figures, or about 38 million. It is officially reported that there were 54,000 collective farms having a total of 18.5 million peasant households in 1959,[26] and that collective farmers accounted for about 35 percent of the total gainfully employed labor force (c. 110 million) of the Soviet Union.[27] In addition, the 1959 census indicated that there were 32,280,000 "collective farmers" by major occupation and, in addition, 9,865,000 family members of collective farmers, workers and employees were engaged in agricultural enterprises.[28]

The enormous size of total Soviet agricultural employment, i.e., some 43 million or more, is in sharp contrast to the number of specialists—professionals and semiprofessionals—who are a part of this labor force directly employed in Soviet agricultural enterprises. Soviet sources do report figures on the total number of specialists who are engaged in agriculture, and thus there is no need for estimates. As of December 1959 all divisions of agriculture employed:[29]

Professionals	91,070
Semiprofessionals	275,226
Total	366,296

Of this total, 126,000 were employed on state farms and auxiliary agricultural enterprises, and 240,000 worked on collective farms, machine tractor and repair stations. Some 25,660 of these latter were collective farm chairmen.

Of the total 91,070 professionals, 18,153 were engineers by training and 66,936 were agricultural specialists by training— agronomists, veterinarians, breeding technicians and foresters. The remaining 5,981 professionals had other, unspecified training. Since the total number of

[22] See *Zheleznodorozhnyi transport*, No. 9, 1957, pp. 41-45; No. 8, 1958, pp. 3-9; No. 3, 1959, pp. 23-24.
[23] *Ibid.*, No. 9, 1957, p. 41.
[24] There is also a small number of individual farmers who do not belong to the collective farms, but their number is not included in any of the above three categories.
[25] *NarKhoz–1960*, p. 588.
[26] *Ibid.*, p. 423.
[27] *Ibid.*, p. 584.
[28] *Vestnik statistiki*, No. 12, December 1960, p. 4.
[29] *NarKhoz–1960*, p. 450; TsSU SM SSSR, *Sel'skoe khoziaistvo SSSR: statisticheskii sbornik* (Agriculture in the U.S.S.R.: Statistical Handbook), Moscow, 1960, pp. 468-469.

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professionals with agricultural training in the whole U.S.S.R. was 222,000 as of December 1959,[30] the number engaged in agriculture directly (66,936) represented 30.2 percent of the total. Thus 155,464, or over two-thirds of all agricultural specialists by training, were employed elsewhere in the economy. Some of these worked in agricultural research institutes, but the majority were probably engaged in governmental administration of agriculture.

Table VI–66 presents data on the occupational composition and distribution of leading personnel in Soviet agriculture in 1957, by sex. Professionals accounted for 17 percent and semiprofessionals, for 46 percent of all leading personnel; the remaining 37 percent were practicals, without formal specialized education. The figures also indicate that collective farm chairmen and directors of state farms accounted for about 11 percent of all leading personnel in Soviet agriculture.

As of January 1957, women held only 21 percent of the leading administrative, managerial and specialized personnel positions in Soviet agriculture. Their largest participation was among animal breeding specialists (44 percent), and agronomists (40 percent), veterinarians (18 percent); but only 10 percent of the heads of various agricultural enterprises were women, and only 1.6 percent of the chairmen of collective farms and directors of state farms were women. In agriculture, as in Soviet industrial and construction enterprises, few women were found in top-echelon leadership.

The pattern of employment of agricultural field specialists can be commented upon further. It has been reported that in 1956 of the 350,000 specialists with higher or secondary specialized education in agriculture, only 18,500, or 5 percent, worked on collective farms, and that about 50,000, or 14 percent, worked in machine tractor stations.[31] As a result of the directives of the 20th Party Congress in 1956, a forceful drive was launched to relocate agricultural specialists who worked largely in agricultural administration offices in the cities. Tens of thousands of agricultural specialists were scheduled to be sent

[30] Appendix table VI–C–5–P.

[31] V. S. Andreev, "Razvitie sotsialisticheskikh proizvodstvennykh otnoshenii v kolkhozakh" (Development of Socialist Production on Collective Farms), in *Uchenye zapiski: Voprosy politicheskoi ekonomiki* (Learned Papers: The Problems of Political Economy), Leningrad State University, 1957, pp. 123–49.

TABLE VI–66.—*Leading administrative, managerial and specialized personnel in Soviet agriculture by occupation and sex as of Jan. 1, 1957*

Occupations	Total personnel		Employment of women		
	Thousands	Percent	Thousands	Percent	Percent of total
Agronomists with higher and secondary specialized education	106.2	18.7	42.5	35.7	40
Animal breeding specialists with higher and secondary specialized education	69.1	12.2	30.4	25.5	44
Veterinary doctors, veterinary technicians and zootechnics	73.9	13.0	13.3	11.2	18
Subtotal	249.2	43.9	86.2	72.4	35
Other agricultural specialists and leading personnel on collective farms, state farms, and other state agricultural enterprises, unspecified	317.4	56.1	32.8	27.6	10
among these: Collective farm chairmen and directors of state farms	[a](63.8)	(11.3)	1.0	0.8	(1.6)
Grand total	566.6	100.0	119.0	100.0	21
Professionals with completed higher education in the grand total	98.0	17.3	.....	.....	.....
Semiprofessionals with secondary specialized education in the grand total	262.0	46.2	.....	.....	.....
Practicals without specialized education	206.6	36.5	.....	.....	.....

[a] Number of collective farm chairmen and directors of state farms estimated on the basis of data in *NKh–1957*, pp. 146–47, and *NarKhoz–1959*, p. 530.

Sources: *Zhenshchina*, p. 49. All data on leading personnel and women are from this source. Professionals and semiprofessionals: figures from appendix tables VI–C–2–P and VI–C–2–SP.

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to collective farms during the next 2 years. However, this campaign has apparently had little success, as revealed by the following comparisons:[32]

	December 1956	December 1957	December 1959
		(thousands)	
Total number of professionals and semiprofessionals employed in agricultural enterprises	360	371	366
Professionals and semiprofessionals with training in agricultural specialties	274	281	267
Professionals only	—	102.5	91.1
Among whom:			
Engineers	—	20.1	18.2
Agricultural field professionals	—	77.6	66.9

In 1959, then, there were fewer specialists with agricultural training employed in agricultural enterprises than there had been in 1956 and 1957. This striking development is in sharp contrast to the growth (by 108,000) in the total number of agricultural specialists.[33] Obviously, while the number of agricultural specialists by training increased some 23 percent from 1956 to 1959, there was a slight decline in the number of agricultural specialists actually employed in agricultural enterprises. The proportion of agricultural specialists so employed declined from 58 percent in 1956 to 46 percent in 1959.

The Stock and Employment of Professionals in the Medical and Health Fields

Table VI–67 presents data on the number of Soviet physicians according to the major specialty in which they were trained. General practitioners make up the largest component, followed by pediatricians, surgeons and gynecologists.

In December 1956 the U.S.S.R. had a reported total of 329,000 physicians (medical doctors) by formal field of training, but the number of professionals (mainly physicians) employed in the health establishments of the U.S.S.R. at that time was only 284,000.[34] Thus, at the end of 1956 at least 14 percent of Soviet physicians worked "elsewhere" and not in medical and public health establishments.

TABLE VI–67.—*Number of physicians in the U.S.S.R. by major specialty (excluding military personnel) as of the end of a given year*

[In thousands]

	1940	1957	1959
Physicians, total	141.8	346.0	379.5
General practitioners (therapists)	42.6	87.2	92.7
Surgeons	12.6	35.0	37.7
Gynecologists	10.6	25.1	27.4
Pediatricians	19.4	48.8	55.0
Oculists	3.6	9.1	9.9
Otolaryngologists	2.6	7.9	8.9
Neuropathologists	3.2	8.5	9.9
Psychiatrists	2.4	5.4	6.1
Physiotherapists	3.9	14.8	16.0
Dermatologists and venereal disease specialists	4.8	9.4	9.3
Roentgenologists	2.7	12.9	14.8
Athletic doctors	.3	1.6	1.6
Public health doctors and epidemiologists	12.5	27.9	29.2
Stomatologists*	6.8	13.6	15.2
Dentists (semiprofessionals)	13.6	26.2	28.5

* Dentists with higher education.
Source: *NarKhoz–1960*, p. 787.

Whereas in industry, transportation, communication and agriculture there were some specialists among the total number employed whose formal training had been in socioeconomic or other fields, in the public health sector it is evident that professional employment is limited primarily to physicians. Another source[35] indicates that the Ministries of Public Health of the U.S.S.R. and all the union republics employed 288,200 physicians in 1956, which is about the same number of professionals (284,000) indicated above (the difference probably due to a slight divergence in institutional grouping). This source also reported that in 1956 higher educational and research establishments in the medical field employed 28,600 research and academic personnel,[36] 1,900 physicians were taking aspirantura training, and 5,700 were interning in hospitals. Assuming that the majority of these *RAP* were medical specialists, we can account for 324,400 health

[32] *NarKhoz-1959*, pp. 528–29; *NarKhoz–1960*, pp. 450–51.
[33] See appendix tables VI–C–2–P, VI–C–2–SP, VI–C–5–P, and VI–C–5–SP:

	1956	1959
Professionals	180,000	222 000
Semiprofessionals	295,000	361,000
Total	475,000	583,000

[34] Appendix table VI–C–2–P.
[35] Ministerstvo Zdravookhraneniia SSSR, *Zdravookhranenie v SSSR* (Health Care in the U.S.S.R.), Moscow, 1957, p. 57.
[36] Of these, 16,400 were employed in higher educational establishments; 8,100 in clinical specialties; 4,700 in theoretical medicine specialties; and 3,600 in other (nonmedical) specialties. *Ibid.*, pp. 165–66.

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professionals in 1956, a figure close to the 329,000 reported in appendix table VI–C–2–P.

Table VI–68 presents data on leading personnel in Soviet public health establishments by occupation and sex. The leading personnel total is correlated (three bottom lines) with the actual employment of professionals and semiprofessionals. Despite the possible withdrawals and employment "elsewhere" (the missing 14 percent noted above), the correlation of professionals employed with the total stock is higher in the medical field than in any other field of Soviet professional specialization. We note, however, that there were only 190,000 physicians without administrative functions. In other words, 94,000 professionals in the health sector were involved in the administration or management of public health establishments. Thus, about one-third of Soviet physicians employed in the health sector of the economy (284,000)

TABLE VI–68.—*Leading administrative, managerial and specialized personnel in Soviet medical and health care establishments by occupation and sex as of Jan. 1, 1957*

Occupations	Total personnel		Employment of women		
	Thousands	Percent	Thousands	Percent	Percent of total
Heads of medical establishments, chief physicians and deputy chiefs	44.4	3.6	25.3	2.3	57
Heads of divisions in medical establishments and of offices and laboratory chiefs	44.2	3.6	32.3	3.0	73
Physicians of all specialties (except dentists) who are not heads of divisions above or chief physicians	190.1	15.5	155.9	14.4	82
Dentists	21.8	1.8	18.1	1.7	83
Laboratory technicians	44.6	3.6	41.9	3.8	94
Assistant physicians, midwives, and medical nurses	818.6	66.4	761.3	70.2	93
Heads of medical aid stations attached to enterprises	26.4	2.1	20.3	1.9	77
Heads of apothecaries (prescription druggists)	2.2	.2	1.8	.2	80
Pharmacists and pharmaceutical chemists	5.8	.5	5.3	.5	92
Subtotal	1,198.1	97.3	1,062.2	98.0	89
Other unspecified medical personnel	33.9	2.7	22.3	2.0	66
Grand total	1,232.0	100.0	1,084.5	100.0	88
Professionals with completed higher education in the grand total	284.0	23.0	.....	.....	.....
Semiprofessionals with secondary specialized education in the grand total	868.0	70.5	.....	.....	.....
Practicals without specialized education	80.0	6.5	.....	.....	.....

Sources: *Zhenshchina*, p. 50. All data on leading personnel and women are from this source. Professionals and semiprofessionals: figures from appendix tables VI–C–2–P and VI–C–2–SP.

combined their practice with managerial functions—running hospitals, clinics, departments, laboratories, and so forth. This situation resembles the pattern of employment for Soviet engineers and agricultural specialists, although the proportion of physicians involved in extra-unit employment was substantially smaller than in other fields.

Table VI–68 also summarizes data on the proportion of women among leading administrative, managerial, and specialized personnel in Soviet medical and health establishments. Although the share of women in this field was 88 percent, and hence the highest of all sectors, even here, among the heads of medical establishments and chief physicians, the proportion of women holding such top jobs dropped to 57 percent. Thus, even in this field, so clearly dominated by the female sex, there were obviously restraints on the women's access to top-echelon positions. Still, the rate of utilization of Soviet women in the medical field is without parallel in any other country.

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Employment, Leading Personnel, and Higher Education Graduates Employed in Soviet Educational-Cultural Services

In 1956 the U.S.S.R.'s educational establishments of all types and cultural-recreational services employed 4,103,000 persons, among them 2,510,000 leading administrative and teaching personnel, and a total of 1,131,000 persons with completed higher education.[37] While the number of leading personnel by sector can be reliably estimated (see table VI–42), there is no similar official information as to the distribution of total employment or of higher education graduates.

In order to construct, at least in approximate terms, the picture of employment of higher education graduates in the educational-cultural sector, the following considerations are relevant. It is known from other data[38] that in the fall of 1956 the total number of teachers and administrators in Soviet general education schools and of teachers in preschool establishments was 1,625,000 and 156,000, respectively. These figures include all administrative school personnel (directors, instruction supervisors, etc.) and they thus comprised the major component of leading personnel (table VI–42—1,839,000) in general education schools and preschool establishments in that year.

It is also known that in 1955 among the total number (1,625,000) of primary and secondary school teachers and administrative personnel, 23.5 percent (392,000) had higher professional education and 26.9 percent (426,000) had 2-year teacher institute education.[39] Thus 818,000 or slightly over 50 percent of those employed in the Soviet primary and secondary school system had higher education. If we assume the same proportion in 1956, the number of teachers with higher education would rise slightly to 840,000.

We do not know what proportion of the preschool teachers had higher education but it was undoubtedly very small (most of these teachers do not have more than normal school 2-year "semiprofessional" education). Even by making a generous allowance, there could not have been more than 5,000 to 10,000 higher education graduates among all preschool teachers (1956—144,000).

Similarly, although no official information is available, it can be assumed that of the leading personnel in cultural services, printing-publishing, arts, and entertainment fields, the proportion of higher education graduates was also small. Assuming that the proportion of higher education graduates was 10 to 15 percent of all leading personnel in cultural services (279,000),[40] it can be estimated that perhaps 27,000 to 40,000 of them had higher education.

The remainder of the higher education graduates in the educational-cultural branch (1,231,000) were thus probably employed in professional and semiprofessional training establishments, their number ranging in 1956 anywhere from 236,000 to 254,000.[41] We know for certain that in 1956 there were 125,000 academic rank appointees in Soviet higher education. All of these were persons with completed higher education, and about half had advanced academic degrees. Furthermore, higher educational establishments certainly employed more higher education graduates than the number of staff academic positions. Although it is not known how many laboratory personnel, librarians, managerial personnel, etc. there were, their number can be estimated as ranging between 25,000 to 37,000 (or 20 to 30 percent). Thus, all told, higher educational establishments could have employed 150,000 to 162,000 higher education graduates. This leaves a residual of 74,000 to 92,000 higher education graduates for employment in semiprofessional schools as administrative or instruction personnel.

All these figures are presented here in order to give a general idea of the approximate pattern of employment of higher education graduates in Soviet education and cultural services. To sum up, the following employment pattern

[37] *NarKhoz—1959*, p. 658. See table VI–42 and further discussion below.

[38] See appendix tables II–A–O, II–D–1, and II–D–2.

[39] Appendix table II–D–2.

[40] See table VI–42: cultural services—214,000; editorial offices in publishing: 38,000; arts and entertainment: 27,000. The known proportion of higher education graduates in the total number of leading personnel in the entire educational-cultural services branch was 16.7 percent.

[41] Grand total—1,231,000, minus professionals in elementary-secondary schools (about 840,000), preschools (5,000 to 10,000), cultural services (27,000 to 40,000).

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of higher education graduates was likely as of 1957:

General education schools and preschool establishments employed	about 840,000
Higher educational establishments employed	150,000 to 162,000
Semiprofessional schools employed	74,000 to 92,000
Cultural services, publishing, arts and recreational facilities employed	25,000 to 37,000

Table VI–69 presents data on leading personnel in specialized manpower training establishments in the U.S.S.R.—professional higher educational establishments and semiprofessional schools. It should be noted that the figures for directors, heads of divisions, etc. (32,700) and teaching personnel (220,000) and their total (252,700) were within the same range as that indicated for the estimated number of professionals (i.e., 234,000 to 254,000) employed in higher and secondary specialized educational establishments. This, then, provides us with an additional check on the above estimates. It is

TABLE VI–69.—*Leading administrative, managerial and specialized personnel in Soviet educational establishments training specialized manpower * by occupation and sex as of Jan. 1, 1957*

Occupations	Total personnel		Employment of women		
	Thousands	Percent	Thousands	Percent	Percent of total
Directors, rectors, and heads of institutions; heads of study or research subdivisions, deans of divisions (*fakul'tety*), heads of branches (*otdeleniia*), and their deputies	32.7	8.4	4.9	3.2	15
Heads of departments (*kafedry*), professors, associate professors (*dotsent*), instructors and assistants	220.0	56.3	90 2	59.2	41
Heads of laboratories, study offices and libraries	10.8	2.8	7.0	4.6	65
Senior laboratory personnel and laboratory technicians	47.9	12.2	32.1	21.0	67
Subtotal	311.4	79.7	134.2	88.0	43
Other unspecified leading instructional and academic personnel	79.6	20.3	18.3	12.0	23
Grand total	391.0	100.0	152.5	100.0	39
Professionals with completed higher education in the grand total, *estimate*	234.0	60.0	.....	.....	.....
Semiprofessionals with secondary specialized education in the grand total, *estimate*	137.0	35.0	.....	.....	.....
Practicals without specialized education, *estimate*	20.0	5.0	.....	.....	.....
Research and academic personnel (*nauchnye rabotniki*) of higher educational establishments only**	125.0	32.0	.....	.....	.....
Administrative and teaching personnel in all other establishments training specialized personnel and higher education personnel other than those with research and academic appointments	266.0	68.0	.....	.....	.....

* Higher educational establishments and technicums.
** Exclusively persons having academic rank, advanced degrees, and completed higher education.

Sources: *Zhenshchina*, p. 53. Estimates are the author's. Figures on academic and research personnel from *NarKhoz–1959*, p. 843 and appendix tables V–B–1 and V–B–2.

evident therefore that some 60 to 65 percent of all leading personnel employed in Soviet higher and secondary specialized educational institutions were persons with professional higher education.

An additional problem remains with respect to estimating the number of instruction and administrative staffs in semiprofessional schools and higher educational establishments. We can assume that these staffs were proportionate to full-time day enrollments,[42] and by using enrollment figures as weights, it may be estimated that in 1957 there were 213,000 and 179,000

[42] I.e., in 1956 enrollments were 1,407,000 in semiprofessional schools (appendix table III–A–1–S) and 1,177,000 in higher educational establishments (appendix table IV–A–1–S). It is assumed that the staffs were distributed proportionately according to the number of full-time students in the two systems. It may well be, however, that the ratio of staff to students in higher education was higher than that in technicums, but since no official data are available, we can only proceed with the estimates under the most simple assumption.

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leading personnel in semiprofessional and higher educational establishments, respectively. The teaching personnel was obviously smaller than the total number of leading personnel.

Table VI–69 also presents data on women among leading administrative, managerial, and teaching personnel in Soviet specialized manpower training establishments. The proportion of women among all the leading personnel was 39 percent; among academic personnel and those with teaching ranks, it was 41 percent; in the supporting technical jobs their proportion was 65 percent or over. However, among directors, rectors and heads of various institutions, the share of women was only 15 percent. Again, as in other fields, relatively few women held the top jobs in Soviet professional and semiprofessional training establishments.

Employment, Leading Personnel and Professional Graduates in Soviet Research and Development, Project Design and Research (Science Service) Establishments

Many Soviet professionals are engaged in research and development and project-making organizations. Research and development is largely separated from production activity by institutional boundaries. (See ch. V.) Most technological research and development institutions are placed under departmental auspices (originally people's commissariats, then ministries, and now regional economic councils, various academies and state committees), and thus represent extra-unit employment. Some of these activities would be considered a part of industry in the American setting, particularly from the point of view of the narrow and applied technological tasks assigned to them. Other types of research (i.e., in linguistics, fine arts, medicine) could, by no stretch of the imagination, be considered part of Soviet industry.

Data on aggregate employment in "research and research services" (*nauka i nauchnoe obsluzhivanie*) were made available for the first time in a 1959 Soviet statistical handbook.[43] Until then, there had been no separate reporting category for this type of employment, and such activities were usually reported mainly under the "educational-cultural" branch. There is a temptation to call this new category "science," "science service," or "science establishments." These would be misnomers, however, and it should be pointed out again that when the words *nauka* or *nauchnyi* are used in Soviet sources, they do not mean "science" or "scientific" only; the new employment reporting in the field of research should not therefore be understood as referring exclusively to scientific research (basic or applied) and development work in the physical sciences or engineering technology. As pointed out in chapter V, "research" covers activities in a variety of fields.[44]

Table VI–70 presents data on total employment in research and research services in the U.S.S.R. for various years. The 1959 statistical handbook referred to above gives figures for total employment in "research and research services," and for two subcategories within it: geological and surveying organizations and hydrometeorological services. Subtracting employment figures for the two subcategories, we arrive at the aggregate employment figures for the third subcategory and the one which concerns us here, "research establishments" of all types.

Research establishments are of three types, according to jurisdictional subordination: (1) those under the auspices of the Soviet academies of science, conducting both theoretical and applied research in diverse fields of knowledge; (2) those which are under the auspices of state committees or regional economic councils, dealing mainly with technological research on design and testing of products and processes; and (3) project design and planning institutes under a variety of departmental auspices, which prepare plans, designs and cost calculations for the construction of various installations—plants, dams, railroads, as well as of entire industrial and residential complexes. In the research establishments of the first category particularly, a significant amount of work is done in fields other

[43] *NarKhoz–1959*, p. 658.

[44] Basic research in the physical sciences; research and development work in engineering, product and process design; project design (industrial, architectural, economic, etc.); medical and agricultural research and experimental laboratories; hydrometeorological services; geological surveying; research in fine arts, languages and literatures; archival and museum work; expeditions to the Arctic or Antarctic, etc.

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TABLE VI–70.—*Total employment in research and research (science) service establishments of the U.S.S.R. for selected years, 1928–59*

[In thousands]

	1928	1932	1937	1940	1950	1953	1955	1956	1957	1958	1959
A. Total workforce of workers and employees	10,790	22,601	26,744	31,192	38,895	43,660	48,380	50,537	53,148	54,600	56,509
B. Research and research services	82	145	279	361	714	860	992	1,094	1,208	1,326	1,462
1. Geological and surveying organizations	10	23	30	70	245	320	365	379	382	398	.....
2. Hydrometeorological service	8	12	15	24	32	39	42	42	45	47	.....
Subtotal 1, 2	18	35	45	94	277	359	407	421	427	445	467[b]
3. Research establishments	64	110	234	267	437	501	585[a]	673	781	881	995[b]
C. Education and culture—original aggregate	789	1,402	2,323	2,930	3,752	.....	4,582	4,776	5,030	.....	.....
D. Education and culture—new aggregate	725	1,292	2,089	2,663	3,315	3,647	3,988	4,103	4,250	4,404	4,549
4. Research (derived from C minus D)	64	110	234	267	437	.....	594[a]	673	780	.....	.....

[a] Note the slight discrepancy in the two figures.
[b] Figures not officially reported; extrapolated from 1955–58 trend.

Sources and Notes

A, B, 1, 2, 3; D, 4.—*NarKhoz–1959*, pp. 658–59; *NarKhoz–1960*, pp. 588–89. *SSSR–Tsif–1960*, p. 295, gives a slightly higher figure (1,474,000) for 1959, row "B."
A, C, (1926–55).—Figures in row "A" are identical with *NKh–1957*, pp. 204–05.
A, C (1956).—Figures in row "A" are identical with *Dos–1957*, p. 251.

than the natural and physical sciences, engineering and industrial technology.

The data in table VI–70 (row 3) make it evident that during the last three decades, the total employment in research establishments of all types increased more than 15 times (from 64,000 in 1928 to 995,000 in 1959). In the same period the aggregate employment of Soviet workers and employees increased only about 5.5-fold, and total industrial employment about sixfold. The recent increase in the number of employees in research establishments—from 500,000 in 1953 to 995,000 in 1959—is to be especially noted.[44a] There is reason to believe that this doubling of total employment in research establishments has been achieved, in part at least, by transfers of research personnel employed originally in the military establishment of the U.S.S.R. (initially not reported in civilian employment figures) to civilian administrative auspices. Genuine growth, however, particularly in view of the massive new effort in atomic, rocket and space research, cannot be discounted.

Table VI–42 above presented data on the number of leading administrative, research and specialized personnel in various types of research establishments in 1957: 246,000 in academy and departmental research establishments (types 1 and 2 above); 167,000 in project institutes and 92,000 in design organizations (both type 3 above). In addition, some 74,000 leading personnel were employed in geological and surveying services. An official figure for leading personnel in hydrometeorological services was not given, but if the ratio of leading personnel to all employees in other research organizations is assumed to hold for hydrometeorological services as well, the number of leading personnel for this subcategory can be assumed to have been about 20,000 in 1957.[45]

The tables below present data on the leading personnel in research establishments (table VI–71) and in project and design institutes (table

[44a] In 1960 research and research services employed a total of 1,732,000 persons (*SSSR–Tsif–1960*, p. 295). At the time of completion of this study, a separate figure for employment in research establishments only was not available, but it may be assumed that a major share of the increment in employment can be attributed to increased employment in research establishments, which probably accounted for 1,200,000 persons.

[45] Leading personnel in hydrometeorological services are included in the residual (item 12) in table VI–42 above.

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TABLE VI–71.—*Leading administrative, managerial, research and specialized personnel in Soviet research institutes and research and development establishments by occupation and sex as of Jan. 1, 1957*

Occupations	Total personnel		Employment of women		
	Thousands	Percent	Thousands	Percent	Percent of total
Heads, directors and deputies of research and research and development establishments, chairmen of research boards and leading specialists	8.8	3.5	1.4	1.2	16
Heads of structural subdivisions in research establishments and deputies	20.5	8.4	4.3	3.4	21
Heads of branch divisions (affiliates) and their deputies	1.5	.6	.5	.3	34
Heads of experimental plants, testing enterprises, experimental establishments, their shops, shifts and units, and their deputies	3.3	1.3	.5	.3	15
Heads of research expeditions, surveying parties and expedition teams, and their deputies	.7	.3	.2	.2	28
Research (academic) personnel (*nauchnye rabotniki*)	58.2	23.7	29.1	22.8	50
Engineers, without administrative functions[a]	50.5	20.6	20.2	15.8	40
Technicians, without administrative functions[a]	45.1	18.4	28.9	22.6	64
Laboratory technicians	35.5	14.5	27.7	21.7	78
Chief accountants and head bookkeepers	4.6	1.9	2.8	2.2	61
Subtotal	228.7	93.2	115.6	90.5	50
Other leading research and administrative personnel, unspecified	16.8	6.8	12.1	9.5	72
Grand total	245.5	100.0	127.7	100.0	52
Professionals with completed higher education in the grand total, *estimate*	(119.5)	48.7	.....	.....	.....
Semiprofessionals with secondary specialized education in the grand total, *estimate*	(65.0)	26.5	.....	.....	.....
Practicals without specialized education, *estimate*	(61.0)	24.8	.....	.....	.....
Research and academic personnel (*nauchnye rabotniki*), grand total, *estimate*	(93.4)	38.0	.....	.....	.....
All other personnel, *estimate*	(152.1)	62.0	.....	.....	.....

[a] Refers largely to specialists with completed higher or secondary specialized education, but not exclusively limited to persons with such education.

Sources: *Zhenshchina*, p. 54. Estimates are the author's. Research and academic personnel derived on the basis of employment weights.

VI–72).[46] We do not have separate data for total employment or the number of higher education graduates employed in these institutions, but as an approximation we can derive the employment and number of professionals and semiprofessionals on the basis of weights for leading personnel. In addition, we can reconstruct matching data for the last prewar year (1941). These data are presented in table VI–73.

Table VI–73 reveals a triple increase in employment, research personnel, and graduate specialists between 1941 and 1957. Turning back to the data on leading personnel in tables VI–71 and VI–72, we observe that research and academic personnel (*nauchnye rabotniki*) in research establishments have been singled out as a separate category. It must be noted that in the leading personnel reporting, this category includes only persons without administrative functions. If persons with administrative functions (i.e., the top five rows of table VI–71, totaling 34,800) were included, as they properly should be (in accordance with the definition of research and academic personnel—*RAP*—in ch. V), then the number of research and academic personnel employed by research establishments would rise to about 93,000. The total number of *RAP* in all types of research organizations was 106,400 at the end of 1956,[47] and therefore the remain-

[46] Note that there is a slight discrepancy between the data in table VI–42, where project and design institutes are given as separate components with the number of leading personnel 167,000 and 92,000 respectively for each, which totals to 259,000, as against the combined total in table VI–72 of 261,200. This slight difference is due to rounding of the percentages on which the estimates were based from the two sets of official data in *Zhenshchina*, p. 46 (first version), and pp. 54–55 (second version).

[47] Appendix table V–B–1.

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TABLE VI–72.—*Leading administrative, managerial, research and specialized personnel in Soviet project-making and design organizations by occupation and sex as of Jan. 1, 1957*

Occupations	Total personnel		Employment of women		
	Thousands	Percent	Thousands	Percent	Percent of total
Heads and deputy heads of project-making and design organizations, chief engineers and other leading specialists	18.8	7.2	1.5	1.4	8
Heads of divisions, sections, design teams and other structural subdivisions of design and project-making organizations, and their deputies	32.3	12.4	5.5	5.1	17
Engineers, without administrative functions[a]	115.5	44.2	46.2	43.1	40
Technicians, without administrative functions[a]	74.8	28.6	45.6	42.6	61
Chief accountants and head bookkeepers	3.2	1.2	2.1	2.0	66
Engineer-economists, economists and planning specialists	4.2	1.6	3.1	2.9	73
Subtotal	248.8	95.2	104.0	97.1	42
Other design and project-making personnel, unspecified	12.4	4.8	3.1	2.9	25
Grand total	261.2	100.0	107.1	100.0	41
Professionals with completed higher education in the grand total, *estimate*	(126.0)	48.3	.....	.....	.....
Semiprofessionals with secondary specialized education in the grand total, *estimate*	(68.0)	26.2	.....	.....	.....
Practicals without specialized education, *estimate*	(67.2)	25.5	.....	.....	.....
Research and academic personnel (*nauchnye rabotniki*), grand total, *estimate*	(13.0)	4.8	.....	.....	.....
All other personnel, *estimate*	(284.2)	95.2	.....	.....	.....

[a] Refers largely to specialists with completed higher or secondary specialized education, but not exclusively limited to persons with such education.

Sources: *Zhenshchina*, p. 55. Estimates are the author's. Research and academic personnel derived on the basis of employment weights.

TABLE VI–73.—*Total employment, leading personnel and employment of professional and semiprofessional specialists in Soviet research establishments, as of 1941 and 1957*

[In thousands]

	Total employment		Leading personnel		Professional higher education graduates		Semiprofessionals	
	January 1941	January 1957	January 1941	January 1957	January 1941	January 1957	January 1941	January 1957
Total research and research services	363	1,094	198	600	91	291	32	158
Geological and surveying organizations	70	379	(38)	74	(18)	[b](36)	(6)	[b](20)
Meteorological services	24	42	(14)	[c]20	(6)	(10)	(21)	(5)
Total research establishments	267	673	146	506	(67)	(245)	(24)	(133)
Research institutes	(143)	(325)	78	245	(36)	(119)	(13)	(65)
Project and design institutes	(124)	[c](348)	68	261	(31)	(126)	(11)	(68)

[a] Derived under the assumed ratio of 42 percent of leading personnel among total employees.

[b] Komarov, *Ekonomicheskii osnovy . . .*, p. 33, gives a figure for professional and semiprofessional graduates combined, who are employed in geological and surveying services, as about 59,000 at the end of 1956, as compared with the estimate of 56,000 in the table above.

[c] It is reported that in 1960 project organizations alone (net of design institutes) employed 300,000 total personnel (*Vestnik statistiki*, No. 8, 1960, p. 8; *Ekonomicheskaia gazeta*, Oct. 26, 1960).

Sources: All figures except those in parentheses are from tables VI–42, VI–70, VI–71, VI–72, and appendix tables VI–C–1–P, VI–C–2–P, VI–C–1–SP, and VI–C–2–SP. The 1941 and 1957 estimates of leading personnel are from *Zhenshchina*, pp. 45, 46, 54, 55.

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ing 13,000 or so research and academic personnel worked in design and project organizations (i.e., among the leading personnel indicated in table VI–72).

Finally, in keeping with the already established pattern, tables VI–71 and VI–72 show that while many women held the more routine research and technical jobs in Soviet research organizations, their share of the top administrative jobs (directors and heads of institutes) ran as low as 8, 15, and 16 percent, which, in view of the fact that they held 41 and 52 percent of the leading personnel positions and comprised 41 percent of all the employees (see table VI–49 above), was very low indeed.

Social Aspects of Soviet Professional Manpower

As the end-product of the social process called "education," professional manpower in its social characteristics provides important insights into the social and political structure of the society it serves. We shall now consider some of the social aspects of Soviet professional manpower.

1. *Role of Women: Summary of Trends*

Women in the Soviet Union comprise a far greater proportion of the professional, technical and managerial labor force than in the West, particularly in the United States. Nevertheless, as shown in the discussion of patterns of employment of professionals in various branches of the Soviet economy, the proportion of higher-echelon positions which they hold (1 to 15 percent) is far from commensurate with the fact that women make up almost one-half of all Soviet workers and employees, and 53 percent of all Soviet professionals.

While the possibility of career advancement for women appears more favorable in the Soviet system than in Western societies, it is still restricted as far as top jobs are concerned. This can be partially attributed to the fact that women themselves tend to gravitate towards jobs which, though lower paid and generally of a routine nature, are more convenient and compatible with family obligations.

Many positions in Soviet professional and technical fields are not as well paid as manual skilled occupations (see below). Wages for doctors, teachers, librarians, etc. tend to be on a par with, or slightly below, the average annual wage of all Soviet workers and employees. Nevertheless, convenience of employment both in terms of physical labor and working hours is an important factor in the women's choice of employment. Social considerations also seem to exercise a strong influence in job selection: women generally prefer positions in areas of welfare, public health and education which are traditionally more "appropriate" and "respectable."

2. *Social Origin of Soviet Professional Personnel*

After the October Revolution, Soviet leaders envisaged a rapid transformation of the managerial, technical, and cultural leadership in the U.S.S.R. Lenin saw a cultural revolution which would change the face of the intellectual elite in Russia. He felt that the prerevolutionary intelligentsia and professionals should be used only until the new proletarian specialists could be trained. Stalin, in the late 1920's and early 1930's, frequently called for a faster pace in the training of working class specialists. Both Soviet leaders tended to view the success of the revolution and the construction of a socialist society as greatly dependent upon newly trained Soviet professionals of proletarian origin primarily. This ideologically and politically dictated orientation was expressed in voluminous legislation and even in early planning—as, for example, in the First Five-Year Plan, which stressed the need for the "proletarization" of specialists (*orabochenie kadrov*).[48]

The policy of proletarization of Soviet professional personnel had to be relaxed in the mid-1930's. (See chapter IV.) By this time the professional labor force had increased about 3-fold and at the same time, the proportion of Soviet professionals of proletarian origin increased by about the same factor. Nevertheless, the major source of additions to professional personnel was still to be found among non-

[48] *Plan kadrov–1930*, pp. 115–29. Beilin, *Kadry*, discusses this problem on almost every page.

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worker, white-collar employees and the intelligentsia. The net results are summarized in table VI–74.

TABLE VI–74.—*Composition of Soviet professional personnel by social origin, 1929 and 1940*

Social groups	Composition of Soviet professionals in percent (year end)	
	1929	1940
Workers and their descendants.....	9.7	30.1
Peasants and their descendants.....	18.9	19.5
"Other": artisans, intelligentsia, white-collar, and former proprietor classes and descendants.....	71.4	50.4
Total professionals.....	287,700	848,200

Sources: Original 1929 distribution from *NarKhoz—1932*, pp. 488–93. Data for 1940 derived by projection of *VUZ* enrollment by social origin in appendix table IV–A–6 upon graduation data.

The significance of the data in table VI–74 can be properly appreciated when it is understood that in 1939 the "other" group (intelligentsia, white-collar employees, and other minor categories), which accounted for only about 7 percent of the U.S.S.R.'s total population represented over 50 percent of the Soviet professional labor force. Workers and their descendants, despite policies favoring them, accounted for a share of professional personnel only slightly higher than their relative share in the total population. Peasants, who made up about 60 percent of the population, were responsible for less than 20 percent of Soviet professional personnel.

It has been argued that because of the expansion of educational facilities (particularly secondary education in urban centers) in recent years, the relative number of professionals of working class origin increased somewhat in the postwar period. In all probability, however, the proportion of higher education graduates of nonproletarian and nonpeasant origin has continued to grow. This view appears to be supported by the fact that the Soviet Government has suppressed the release of any statistical data dealing with the distribution by social origin of students in Soviet higher educational establishments.[49]

[49] See ch. IV, pp. 350–352.

The present drive to "democratize" higher education by expanding part-time education, sending workers to school, and so forth, indicates that the "proletarization of cadres" is once again the official policy. Whatever results this may bring in the future, it appears that for the present over one-half of Soviet professionals are descendants of the Soviet technical bureaucracy.

3. *National Composition of Soviet Professional and Semiprofessional Manpower*

Table VI–75 presents data on the national composition of professionals and semiprofessionals employed in the Soviet economy on December 1, 1959. The data refer to the stock of trained manpower by nationality and reflect the nature of the educational policies applied during the last three decades to the various nationalities in the U.S.S.R.

The composition of professional and semiprofessional manpower by nationality has to be interpreted in the light of the national makeup of the Soviet population. Table VI–75 compares therefore two sets of figures with the national composition of the U.S.S.R. based on the population census of January 1959. It is evident that four nationalities—Russians, Georgians, Armenians, and probably Jews[50]—had a larger representation among professionals than their respective share in the population. Among semiprofessionals, Russians and Georgians had a representation higher than their respective weights in the population. The heavy representation of Russians is particularly striking. They accounted for about 66 percent of all semiprofessionals while representing only about 55 percent of the total population. In this connection, it must be remembered that semiprofessional training is heavily localized and associated with applied education for industrial jobs. The high proportion of semiprofessionals of Russian origin can probably be explained by the relatively high level of industrial development on the territory of the Russian SFSR, as compared with other (particularly Central Asiatic) republics.

The data also raise once again the controversial question of the treatment of Jews in Soviet higher education. At the end of 1959,

[50] See footnote *b* to table VI–75.

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TABLE VI–75.—*Composition of Soviet professionals and semiprofessionals by nationality and sex within national groups, December 1, 1959*

Nationality	Distribution in 1959 population census (percent)	Professionals				Semiprofessionals			
		Thousands	Distribution in percent of total	Women		Thousands	Distribution in percent of total	Women	
				Thousands	Proportion in percent			Thousands	Proportion in percent
Russians	54.9	1,875.2	*58.1	1,077.5	†57.4	3,139.1	*65.8	2,125.3	†67.7
Ukrainians	17.7	471.1	14.6	238.9	50.7	748.1	15.6	465.9	62.3
Belorussians	3.6	87.9	2.6	44.0	50.1	147.2	3.1	97.7	†66.4
Uzbeks	2.9	42.2	1.3	9.1	21.6	43.9	.9	10.9	24.8
Kazakhs	1.7	31.5	.9	8.9	28.2	37.2	.8	12.3	33.1
Georgians	1.2	83.6	*2.6	32.4	38.7	62.2	*1.3	37.3	60.0
Azerbaidzhans	1.4	44.1	1.4	14.0	31.7	45.5	.9	17.4	38.2
Lithuanians	1.1	26.9	.8	13.4	49.8	39.1	.8	26.2	†67.0
Moldavs	1.1	9.9	.3	4.3	43.4	18.6	.4	11.4	61.3
Latvians	.7	22.8	.7	12.5	*54.8	35.0	.7	21.6	61.7
Kirgiz	.5	8.6	.3	2.1	24.4	8.4	.2	2.5	29.8
Tadzhiks	.7	10.2	.3	1.8	17.6	11.8	.2	1.9	16.1
Armenians	1.4	69.0	*2.1	29.2	42.3	52.1	1.1	30.1	57.8
Turkomen	.5	8.8	.3	1.2	13.6	9.1	.2	1.3	14.3
Estonians	.5	17.9	.5	9.1	51.8	27.3	.6	17.8	†65.2
Subtotal, union-republic nationalites	89.9	2,809.7	86.8	1,498.4	53.3	4,424.6	92.6	2,879.6	65.1
All other nationalities, total	10.1	426.0	13.2	202.5	47.5	356.5	7.4	206.1	57.8
Among which: identified nationalities, total	6.4	110.2	3.4	51.3	46.6	178.7	3.8	107.8	60.3
Among which:									
Bashkirs	.5	5.7	.2	2.5	43.8	9.2	.2	5.3	57.6
Buriats	.1	3.7	.1	1.6	43.2	4.3	.1	2.7	62.8
Nationalities of Dagestan	.4	6.6	.2	1.6	24.2	9.8	.2	3.1	31.6
Karelians	.1	1.3	(a)	.7	†53.8	3.6	.1	2.6	†72.2
Kabardins	.1	2.2	(a)	.5	22.7	2.3	(a)	1.3	56.5
Balkars	.1	.2	(a)	.06	30.0	.6	(a)	.2	33.3
Komi	.2	4.0	.1	2.6	†65.0	10.5	.2	7.3	†69.5
Mari	(b)	2.2	(a)	.6	27.3	5.1	.1	2.8	54.9
Mordvins	.6	5.7	.2	2.5	43.8	12.1	.2	7.0	57.8
Osetins	(b)	8.5	.3	3.8	44.7	7.8	.2	4.9	62.8
Tatars	2.8	46.4	1.4	25.4	†54.7	74.3	1.6	48.6	†65.4
Udmurts	.3	4.3	.1	2.7	†62.8	8.3	.2	5.5	†66.3
Chechens	.2	.3	(a)	.06	20.0	.6	(a)	.1	16.7
Ingushes	(b)	.2	(a)	.05	25.0	.4	(a)	.07	17.5
Chuvashes	.7	13.1	.4	4.9	37.4	20.7	.4	12.3	59.4
Yakuts	.1	2.8	(a)	1.0	35.7	5.5	.1	2.7	49.1
Kalmyks	(b)	.4	(a)	.1	25.0	1.0	(a)	.5	50.0
Karakalpaks	.1	1.8	(a)	.3	16.7	1.8	(a)	.3	16.7
Abkhazes	(b)	.8	(a)	.3	37.5	.8	(a)	.5	62.5
Other nationalities, unidentified:	▪3.7	▸315.8	*9.8	151.2	47.9	▸177.8	3.6	98.3	55.3
U.S.S.R. grand total	100.0	3,235.7	100.0	1,700.9	52.6	4,781.1	100.0	3,085.7	64.5

See Sources and Notes on p. 532.

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there were an estimated 210,000 professionals of Jewish origin (see footnote *b* to table VI–75), representing about 6 percent of the total. In accordance with common practice, Jews are not listed as a separate nationality in Soviet reporting on the stocks of professional and semiprofessional manpower, but are included in the "residual." In 1959 their share of professional positions (about 6 percent) was thus still somewhat larger than their proportion in the total population (1.1 percent).

However, from December 1957 to December 1959, while the total number of professionals increased by 430,200 (1957: 2,805,500; 1959: 3,235,700), or 15.4 percent, the number of professionals in the "residual nationalities" category, of whom Jews constitute the major component, grew by only 12,200 (1957: 303,600; 1959: 315,800), or 4 percent.[51] In this connection it should be pointed out that in 1958 the proportion of Jews among higher education students was only about 4 percent,[52] a rate smaller than their historical rate of representation among the total stock of professionals. These official Soviet statistics seem to substantiate a number of unofficial reports that deliberate discrimination against admission of Jews to higher education in the U.S.S.R. has been taking place, and such policies would explain why the additions to the stock of professionals of "residual nationalities" have been disproportionately low in recent years and why Jews have thus continued to lose ground among Soviet professionals.

Despite Soviet claims about the development of a new Soviet intelligentsia over the last 43 years from among national minorities, it is evident from the data in table VI–75 that the proportion of members of most Central Asian minorities, and all other minor nationalities, in the ranks of Soviet professionals and semiprofessionals represents only one-half, or even less, of their respective shares in the population. Substantial progress has been made, but there is still a long way to go before the long-heralded "equivalent representation" for most non-Russian nationalities is actually realized.

Table VI–75 also provides information on the number and proportion of women among professionals and semiprofessionals by nationality. The figures indicate that among professionals, women of several nationalities—Russian (57.4); Latvian (54.8); Karelian (53.8); Komi (65.0); Tatar (54.7); and Udmurt (62.8)—were more highly represented than they were among all professionals taken together (52.6 percent). Women professionals of the other nationalities had a representation below that for all nationalities. Particularly low representation was held by women of the four major Central Asiatic nationalities—Turkmen (13.6); Tadzhik (17.6); Kazakh (21.6); and Kirgiz (24.4); and also by women of eight of the minor nationalities (Karelian, Balkar, Komi, Mordvin, Ingush, Chuvash, Kalmuk, and Karakalpak), all shares being under 30 percent. A similar pattern of low representation of women held among semiprofessionals—Turkmen (14.3); Tadzhik (16.1); Kazakh (24.8); and Kirgiz (29.8); as well as among several minor nationalities. Only eight nationalities had a higher representation of females among semiprofessionals than the rate for all nationalities combined (64.5 percent), among them particularly, the Russians, Belorus-

[51] *NarKhoz–1959*, pp. 688–89; table VI–75.
[52] See ch. IV, section on nationalities.

Sources and Notes to Table VI–75

* Representation among professionals and semiprofessionals higher than the respective share of the same nationality in the population.

† Representation of women among professionals and semiprofessionals of a given nationality is higher than the average representation of women among all professionals and semiprofessionals.

[a] Consists of Jews (1.1 percent), Germans (0.8 percent), Poles (0.7 percent) and 40-odd other minor nationalities (1.1 percent)

[b] Although Jews are identified in the population census (1.1 percent), it is common in Soviet reporting of statistics on professionals and semiprofessionals to include Jews in the "unaccounted residual." To judge from enrollment data by nationality, two-thirds of the "unaccounted residual" is composed of Jews. Thus in 1959 about 210,000 professionals and 120,000 semiprofessionals were Jews.

[p] Each nationality accounts for a fraction of 0.1 percent. The sum of 5 "p's" equals about 0.1 percent and is included in the total (6.4 percent)

[q] fraction of 0.1 percent. The sum of 10 "q's" equals 0.4 percent (12,400).

[r] fraction of 0.1 percent. The sum of 7 "r's" equals 0.2 percent (7,200).

Sources: National composition of the U.S.S.R. computed on the basis of the 1959 population census report in *Pravda*, Feb. 4, 1960. Data on professionals and semiprofessionals from *NarKhoz–1960*, p. 617. Similar data for 1956 and 1957 are available in *NarKhoz–1959*, pp. 688–89; *SSSR-Tsif–1958*, pp. 324–26; *Dos–1957*, p. 261.

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sians, Lithuanians, and Estonians. Thus whatever gains may have been claimed, it is apparent that women of many nationalities, particularly those of Central Asia's major national groups, still have not made significant inroads into the ranks of specialized personnel in the Soviet Union.

4. *Soviet Professionals and Communist Party Membership*

There are two ways of looking at the relationship between the Communist Party and Soviet professional and semiprofessional manpower. One approach is to consider the proportion of Communist Party members among these groups, and the other is to analyze what proportion of the total party membership consists of professional or semiprofessional specialists. These two approaches represent two distinct quantitative problems.

The first addresses itself to the question of the extent to which the Communist Party controls (in quantitative terms at least) the ranks of Soviet specialists. The second deals with the question of the extent to which party membership is influenced (again, quantitatively) by the professional and semiprofessional elite within its ranks. Both considerations are equally important to a proper understanding of the role the Communist Party plays in the direction of Soviet specialized manpower, its recruitment, and the mobilization of its efforts. As has been so acutely remarked, the party "can discharge its governing responsibilities effectively only by assimilating the most highly trained and educated representatives of the oncoming generations." [53]

TABLE VI–76.—*Communist Party membership, total, and number and proportion of trained specialists within its ranks, 1929–59*

Year	Total membership (members and candidates) (thousands)	Specialists with higher or secondary specialized education		Professionals with completed higher education		Semiprofessionals with secondary specialized education	
		Thousands	Percent	Thousands	Percent	Thousands	Percent
1929	1,535	.....	.....	9	.6	.....	.....
1939	2,307	.....	.....	137	5.9	.....	.....
1947	6,300	.....	.....	400	6.3	.....	.....
1956	7,215	[a]1,878	26.0	801	11.2	1,077	14.8
1959	8,239	[b]2,300	27.9	(1,000)	12.2	(1,300)	15.7

[a] In addition, in 1956 there were 257,000 Communist Party members with partial higher education.
[b] In addition, in 1959 there were an estimated 800,000 party members with partial higher education.

Sources and notes: Fainsod, *How Russia Is Ruled*, pp. 212, 231; *Partiinaia zhizn'*, Oct. 1947, pp. 78-83. 1956—*Pravda*, Feb. 17, 1956. 1959—*Pravda*, Jan. 30, 1959. Figures in parentheses are the author's estimates on the basis of 1956 weights.

Table VI–76 presents a summary of data on the number and proportion of trained specialists in the Communist Party. In the last 30 years, the proportion of professionals who were also party members increased from an insignificant 0.6 percent in 1929 to 12 percent in 1959. This increase was particularly noticeable in the postwar period, when in the course of 10 years (1947–56) the number of professionals with party cards doubled (1947—400,000; 1956—800,000).

In 1959, 28 percent of all party members were specialists with completed higher or secondary specialized education. If this total of trained specialists (2,300,000) is added to the number of party members with partially completed higher education and those with general secondary education (i.e., 2,063,000),[54] then about 52 percent (or 4,363,000) of the party membership had completed secondary schooling or education beyond the secondary school level. When it is remembered that among the Soviet population aged 15 and over, only 16 percent had completed general or secondary specialized or

[53] Fainsod, *How Russia Is Ruled*, p. 239.

[54] *Pravda*, Jan. 30, 1959.

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higher education,[55] the strikingly high educational attainment of Communist Party members becomes remarkable indeed.

It is equally notable that while in the three years between party congresses (i.e., 1956 to 1959) total party membership grew by about 14 percent, the number of party members with 10 or more years of education increased by 24 percent.[56] Although the directives of the 20th Party Congress in 1956 explicitly stated that membership should be recruited primarily from among workers and peasants,[57] 37.8 percent of the new members admitted to the party in 1958 were representatives of the intelligentsia (i.e., nonworkers or nonpeasants).[58] The party has thus continued in recent years to draw heavily upon the educated strata of the population, a trend begun two decades ago.

Table VI–77 illustrates the penetration of Soviet professional manpower by party members.

TABLE VI–77.—*Communist Party members among Soviet professionals, 1929–59*

Year	Number of professionals in the Communist Party (thousands)	Total population of professional graduates		Professionals employed in the national economy	
		Thousands	Proportion in the party	Thousands	Proportion in the party
1929	9	.....	.....	233	3.8
1939	137	1,177	11.6	908	15.1
1947	400	.....	.....	(1,200)	30.0
1956	801	.....	.....	2,631	30.5
1959	1,000	3,778	26.5	3,026	30.8

Sources and notes: Text tables VI–6 and VI–76; appendix tables VI–A–2–P and VI–B–4–P. The number of professionals employed in the national economy in 1947 is the author's estimate.

The data in table VI–77 are somewhat tricky. The number of professionals with party membership refers to all professionals (i.e., employed in the civilian economy, in the military, or retired). It is important to consider the significance of the last two columns in the table. One concerns the total number of professionals (i.e., including those in retirement and military service), and the other only professionals employed in the national economy. (Data for the first category—the total population of Soviet higher education graduates—are available only for the census years 1939 and 1959.) As could be expected, the proportion of party members among the *total* number of Soviet professionals is somewhat lower (by about 5 percent) than among the professionals employed in the national economy only.

These differences result from correlating the total number of professionals with party membership (1959—1,000,000) with two different totals: the total population of professionals (1959—3,778,000), and the total of professionals employed in the national economy (1959—3,026,000). If it is assumed that the proportion of party members among professionals employed in the civilian economy was the same as among the total population of professionals, then there were approximately 810,000 professionals—Communist Party members employed in the civilian economy and some 190,000 outside—presumably for the most part in the military establishment of the U.S.S.R., and some who were retired. We do not know how many in fact are active in the military, but if we assume that an overwhelming majority of the 190,000 are so employed, then it would appear that about 52 percent of the professionals in the Soviet military establishment (approximately 360,000) (see p. 448 above) were Communist Party members in 1959. This proportion is approximately twice as large as that indicated for party members among professionals employed in the civilian sector.

The data in table VI–77 reflect the rapid

[55] Table VI–4 above. The total adult population aged 15 and over was 148 million in 1959. The total number of persons with completed secondary, partial higher or higher education was 23.3 million.

[56] *Pravda*, Jan. 30, 1959 (V. M. Churaev, report of the Accrediting Commission of the Congress).

[57] *Pravda*, Feb. 17, 1956.

[58] *World Marxist Review*, Vol. 2, No. 6 (June 1959), p. 30.

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integration of professional manpower into the ranks of the Communist Party. While in 1929 only about 4 percent of all professionals employed in the national economy were members of the Communist Party,[59] in 1939 12 to 15 percent claimed party membership. The sharpest increase in the number of professionals belonging to the party took place during and shortly after the Second World War. In 1947 about 30 percent of Soviet professionals employed in the national economy were members of the Communist Party. In the same year about 38 percent of the engineers employed in the national economy, about 19 percent of medical doctors, about 19 percent of agricultural professionals, and about 16 percent of professionals in the field of education were party members.[60] Since then, although the number of professionals who are party members has more than doubled (1947—400,000; 1959—1,000,000), the *proportion* of Communist Party members among professionals has remained relatively stable: about 25 to 30 percent of the grand total.[61]

The increase of Communist Party membership among professionals was brought about by the radical shift in party policy on admissions and recruitment in the mid- and late 1930's.[62] During that period various restrictions against intellectuals, white-collar workers, and other nonproletarian social groups were lifted, and extensive campaigns to recruit professionals into the party were conducted. Despite this drive to integrate professionals into party ranks, and despite the substantial gains in the relative proportion of party members among professionals after the mid-1930's, it is surprising to note that in 1959, after more than 40 years of communist rule, only about one-fourth of all professionals had been integrated into the Communist Party of the Soviet Union.

Table VI–78 presents comparative data on the numerical distribution of Communist Party members, workers and employees, leading personnel, and professionals throughout the various branches of the Soviet economy. The data reveal a remarkable pattern.

Soviet sources claim that in 1959 the majority (62 percent) of all Communist Party members worked in the "production branches" of the economy,[63] where undoubtedly many communists were active as rank-and-file workers and employees. Out of every eight workers and employees in the "production branches," one person was a party member. If we add to this group the bulk of agricultural employment (i.e., approximately 38 million collective farmers), the proportion of party members drops to 1 out of every 16 gainfully employed persons. But this proportion is in sharp contrast to that prevailing in the social service fields and government administration. In the social services (education and public health), 1 out of every 6 employees was a party member. In government administration and management, the ratio was even higher —1:3. Clearly, there is an enormous concentration of Communist Party members in Soviet social services and, particularly, in government administration. Moreover, these statistics do not show that a large proportion of the party members employed in the "production branches" of the economy (industry, agriculture, etc.) are in fact concentrated in managerial and supervisory positions. This can be confirmed from scattered reports on individual economic units, plants, enterprises, and state and collective farms.

Another relevant point should be brought out in this connection. The congress of the Communist Party is in theory the supreme party organ. In reality, however, the congresses are merely assemblies of prominent party leaders gathered for the purpose of being told what the ruling circle of the party has already decided, how these policy decisions are to be carried out, and how "mass support" for their execution is to be mobilized. Despite their lack of real decision-making power, the congresses are never-

[59] See *NarKhoz—1932*, p. 492. This source gives the proportion of party members among Soviet professionals employed in the production branches of the economy (i.e., excluding education and medicine) as 7 percent of the professionals thus employed. The proportion of all professionals employed in the national economy who were party members was thus somewhat lower than in the production branches alone.

[60] These percentages were ascertained on the basis of data on Communist Party membership presented in *Partiinaia zhizn'*, No. 20, Oct. 1947, pp 73–83, and the estimated number of professionals by field for 1947.

[61] Note again that the number of professionals belonging to the party is reported as a total figure, regardless of where they are employed—civilian economy or the military. There are, however, two different figures for professionals—those employed in the civilian economy and a figure for total population of professionals, which results in the two correlations, 25 and 30 percent, respectively.

[62] For further details, see Fainsod, *How Russia Is Ruled*, pp. 225–32, 238.

[63] See table VI–78, last column.

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TABLE VI–78.—*Total employment, leading personnel, professionals and Communist Party membership by branch of the Soviet economy*

Branches of the economy	Total employment of workers and salaried employees (1956)		Leading managerial personnel and specialists (1957)		Professionals with completed higher education (1957)		Communist Party membership (1959)	
	Thousands	Distribution in percent	Thousands	Distribution in percent	Thousands	Distribution in percent	Thousands	Distribution in percent
Industry and related sectors	28,984	.....	3,332	.....	719	.....	.....	.....
Agriculture (workers and salaried employees only)	6,485	.....	567	.....	98	.....	.....	.....
Trade and distribution	3,826	.....	574	.....	28	.....	.....	.....
Total:								
(excluding collective farmers)	39,295	77.8	4,473	47.7	845	32.2	5,120	62.0
(including collective farmers)	(77,295)	.....	4,473	47.7	845	32.2	5,120	62.0
Government administration and economic management	4,403	8.7	1,141	12.2	373	14.2	1,230	15.0
Social services: educational-cultural and public health	6,839	13.5	3,742	40.1	1,415	53.6	1,150	14.0
Total:								
(without collective farmers)	50,537	100.0	9,356	100.0	2,633	100.0	7,500	91.0
(with collective farmers)	88,537	.....	9,356	.....	2,633	.....	7,500	91.0
Residual (party organization proper, military establishment & retired)	.....	.....	.....	.....	.....	.....	740	9.0
Grand total	.....	.....	.....	.....	.....	.....	8,240	100.0

Sources: Employment, leading personnel and professionals from tables VI–33 and VI–42. Communist Party membership from *World Marxist Review*, vol. II, No. 6, June 1959, p. 31, where percent distribution is given and absolute figures were derived.

theless accurate indicators of the leadership status of the various social segments (workers, peasants, bureaucracy or highly trained personnel) of the party. Table VI–79 presents data on the distribution of delegates by level of educational attainment at various party congresses.

In 1934, professionals with completed higher education were indeed in a small minority (10 percent), but by 1939 they had increased to more than 26 percent of the delegates. In the 1950's, over one-half of all delegates to party congresses were professionals with completed higher education. This is a clear indication of the influx of professionals into the leading hierarchy of the Communist Party.

In summary, then: Soviet specialists—professionals and semiprofessionals—comprised over one-fourth of the Communist Party membership in 1959; among professionals, Communist Party members represented one-fourth (or up to 30 percent) of the total stock of higher education graduates; over one-half of the delegates to party congresses since 1952 were persons with higher education. These data suggest the following conclusions. Although the integration of professionals with the Communist Party is far from complete, substantial interlocking between the two groups is in effect. Considering that the Communist Party represents only 4 percent of the total population of the U.S.S.R. and that Soviet professionals themselves represent only 1.8 percent of the total population, the interdependence of the professional elite and the Communist Party is indeed of significant magnitude.

The hope has often been expressed that the

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TABLE VI–79.—*Delegates to Communist Party congresses by level of educational attainment*
[In percent]

Level of education	1934 17th Congress	1939 18th Congress	1952 19th Congress	1956 20th Congress	1959 21st Congress
Higher education	10.0	26.5	59.5	55.9	[a]58.8
Incomplete higher education	.....	5.0	7.0	8.6	5.3
Secondary education	31.0	22.5	18.7	12.5	12.2
Elementary and incomplete secondary education	.....	46.0	14.8	23.1	26.7

[a] These are 708 delegates with completed higher education out of a total of 1,269 delegates. Among the 108 professionals at the congress, 287 were engineers, 81 agronomists, 85 teachers, 30 "other specialists," leaving a residual of 225 delegates with higher education who were party functionaries or in the military establishment of the U.S.S.R.

Sources and Notes: Fainsod, *How Russia Is Ruled*, especially pp. 337–38; see table 9 in H. McClosky and J. E. Turner, *The Soviet Dictatorship*, New York: McGraw-Hill, 1960, p. 261; *Pravda*, Oct. 9, 1952; Feb. 17, 1956; Jan. 30, 1959.

economic and political interests of the Soviet professional-technical elite and the Communist Party would conflict. However, the statistics clearly show that a quarter of the party membership and a quarter of all professionals with party membership find both roles not only compatible, but probably mutually beneficial. The party allegiance of professionals as a group, in membership terms at least, is far more pronounced than it is among the population at large. In addition, party representation among other strata of the population is much lower than it is among professionals. Furthermore, the degree of interlocking between the top echelons of the party and the leading administrative elite is even more extensive. There are, indeed, virtually no key administrative or high executive jobs, be they those of plant director, director of a higher educational establishment or research institute, a dean of a university or a head of a hospital, which can be held by a person either not a party member or specifically cleared for the job by the Communist Party personnel offices. Under such circumstances, the party card remains one of the most essential assets in the career advancement of professionals to positions of leadership.

Professional Wages and Incentives

Does it really "pay" to be a professional in the U.S.S.R. in terms of income differentials and other rewards? Perhaps no other topic in the recent debate concerning the Soviet educational challenge has been more generously abused than that of material incentives for Soviet professionals; for it has often been contended that the material rewards for the work of Soviet intellectuals are uniformly high and that the Soviet regime has offered the "boldest incentives" for its intellectuals.

We cannot attempt in this study a multidimensional rating of Soviet occupations.[64] Instead, table VI–80 presents summary information on ratings for selected occupations, compiled by the Harvard Project on the Soviet Social System of the Russian Research Center, based on 2,146 interviews of former Soviet citizens, concerning desirability, reward, personal satisfaction, political safety and popular regard for 13 occupations. It should be noted that the data are indicative of the subjective attitudes of the former Soviet citizens toward the advantages or disadvantages of one occupation compared with another.

One of the most important rating indicators is wages, which calls for a more thorough discussion. Despite the more abundant flow of statistical information in recent years, the Soviet Government continues to withhold most information concerning aggregate wages and total earnings for specific occupational groups, industry sectors and branches of the national economy. There is information, however, on individual wage scales which can be pieced together to provide a meaningful picture of the wage differentials which prevail among different occupations.

Article 12 of the Soviet Constitution pro-

[64] For a penetrating article on this subject, see P. H. Rossi and A. Inkeles, "Multidimensional Ratings of Occupations," *Sociometry*, vol. 20, No. 3 (September 1957), 234–51.

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TABLE VI–80.—*Rating profiles for selected occupations*

Occupation	Desirability	Material position	Personal satisfaction	Safety	Popular regard	Summary		
						+	0	1
Doctor	+	0	+	+	+	4	1	0
Scientist	+	0	+	0	+	3	2	0
Engineer	+	0	0	—	+	2	2	1
Factory manager	+	+	+	—	—	3	0	2
Foreman	0	0	0	0	0	0	5	0
Accountant	0	0	0	0	0	0	5	0
Army officer	0	+	0	—	0	1	3	1
Teacher	0	—	—	+	+	2	1	2
Worker	0	—	—	+	0	1	2	2
Brigade leader	—	—	—	0	—	0	1	4
Party secretary	—	+	+	0	—	2	1	2
Farm chairman	—	+	0	—	—	1	1	3
Collective farmer	—	—	—	+	0	1	1	3

NOTE.—A + indicates that an occupation ranks among the top four; a 0 indicates ranking among the middle five; and a — indicates ranking among the lowest four. The occupations are listed in order of average desirability.

Source: Rossi and Inkeles, *op. cit.*, 241.

claims that it is a duty and honor for every able-bodied Soviet citizen to work: "He who does not work, neither shall he eat." And, according to a basic principle of socialism, "From each according to his ability, to each according to his work." Communist ideology, the Revolution, and the very rise of the Soviet regime were originally aimed at creating an egalitarian society, where wage differentials for different types of work would allegedly cease to exist. In the 1920's this was the professed goal of the regime, and "equal reward" (*uravnilovka*) was the party's slogan.

With the emergence of the industrial order, however, and with the ever-increasing need to step up the productivity of labor and the output of economic goods, this principle was abandoned, and a differentiated wage structure emerged instead. In this differentiated structure, "work" was defined in terms of the individual's "productive contribution," and in the sphere of material production an attempt was made to set wages, to some extent at least, in accordance with the relative value of the product.[65]

In other kinds of "work"—in trade, social services, government, management, administration, the arts, the military establishment, etc.—wages also had to be differentiated. In each case wages were set by administrative decrees of the Soviet Government. It was thus officially postulated that "the wages of employees in offices [66] and administrations, as well as the wages of administrative-managerial personnel in production enterprises [*ETMP*] should be set according to state norms, that is, on the basis of specific normative legislative acts issued by the government establishing precisely the occupational titles, determining precisely the staffs, and setting precisely the wage for each occupation." [67] The administered wage has thus been set for various types of employees—managerial personnel, administrative workers and office employees, teachers and lawyers, professors and researchers, veterinarians, agronomists, academicians, street sweepers, firemen, postal workers, and literally thousands of other occupations.

In setting these wages, the state normative acts theoretically took into account several criteria, such as: (1) the "amount of work" in a given occupation or a specific job; (2) the qualifications (in terms of education and experience) needed to perform the job; (3) the degree of "responsibility" attached to the job; (4) the length of uninterrupted employment in a given

[65] See A. Bergson, *The Structure of Soviet Wages: A Study in Socialist Economics*, Cambridge: Harvard University Press, 1944.

[66] The Russian term is *ucherezhdenie*, which means any kind of unit which is not engaged in the production of material goods. The term includes schools, hospitals, various services, administrative agencies, research establishments, etc.

[67] N. G. Aleksandrov, *Zakonodatel'stvo o trude: Kommentarii* (Legislation on Labor: Interpretive Review), Moscow, 1947, p. 71. A slightly revised version is in N. G. Aleksandrov *et al.*, *Zakonodatel'stvo o trude: Kommentarii k zakonodatel'stvu o trude SSSR i kodeksu zakonov o trude RSFSR* (Legislation on Labor: Interpretive Review of the Legal Code on Labor in the U.S.S.R. and Code of Legislative Decrees on Labor in the Russian SFSR), Moscow, 2d ed., 1954, p. 94.

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occupation; (5) the "weighted priority" of a given branch or industry sector of the national economy; and (6) the location of the employing unit. These considerations were said to take full account of the "quantity and quality of work" required by the various jobs and thus constituted sufficient criteria for determination of the wage scales.[68] Aside from these generalities, however, no meaningful descriptions have appeared in Soviet sources as to how wages are really determined in an operational way[69] and what criteria actually guide the Soviet planners in deciding, for example, that a medical doctor should get "X" wages if he works as a general practitioner and better than twice "X" wages if he teaches. It is known who sets the wages and in some instances what the actual wages are, but the "why's" of wage determination remain largely obscured.

Whatever the operational features of wage setting may be, a politically administered wage structure is in existence in the Soviet Union. The salaries of employees in any given office were worked out during the 1930's by the different economic commissariats and subsequently legalized by the Supreme Economic Council or the Council of Commissars (later Council of Ministers). Each such governmental decree contained a roster of job titles, staffs and wage scales applicable to a given office or industrial plant. Curiously enough, the various commissariats and administrations had somewhat different staffing schemes and wage scales. The staffing schemes and wage scales were simultaneously registered with the Commissariat of Finance.

Shortly before the Second World War a separate administration, the State Commission on Staffs (*Gosudarstvennaia Shtatnaia Komissiia*)[70] was established for the purpose of setting uniform wage scales for salaried employees and staffing organizations. The commission has been compared to the U.S. Civil Service Commission, in that it had jurisdiction over government personnel and their salaries. This, however, is not an entirely accurate comparison, since the Soviet State Commission on Staffs had jurisdiction over the determination of staffs and salaries in *all* economic ministries, and over the staffs and salaries in professional service occupations as well.

Approximately in 1953 the State Commission on Staffs was put back under the jurisdiction of the Ministry of Finance, which, in its department of staffs, continues at the present time to register and approve annually all staff positions and basic wages paid to salaried employees in these positions.[71] Every office, organization, hospital, school, etc. must submit to the appropriate local office of this department its staffing schedule listing all salaried jobs and basic wages. Each staff and salary schedule has to be "approved" in accordance with the existing legislation concerning staffs and wages. After obtaining the approval, the organization is given permission to draw upon the wages fund account in the state bank.

During the last three decades so many different jobs were singled out for a specific wage designation, and, as a result, so many different job gradings and wage scales for production workers came into being, that in 1955 a new State Committee on Labor and Wages was formed, with the function of studying the wage structures in particular industries and of streamlining them. The results of this committee's studies are just beginning to appear in the form of a revised wage structure which little by little is being introduced in various sectors of the Soviet economy.[72]

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[68] Perhaps the most concise statements of the guiding principles can be found in the two Aleksandrov volumes, *op. cit.*, pp. 71–77 (1947 volume) and pp. 94–102 (1954 volume). In addition, many Soviet economics textbooks reiterate these principles to a varying extent.

[69] Many accounts may be found stating what the wage regulations *are*, such as in V. A. Goloshchalov (comp.), *Raschety s rabochimi i sluzhashchimi* (Accounts with Workers and Employees), Moscow, 1954; and *Spravochnik profsoiuznogo rabotnika* (Handbook of Trade Union Workers), Moscow, 1958, esp. pp. 80–115.

[70] The predecessor of the State Commission on Staffs, an independent agency, was originally established in 1931 under the auspices of the Commissariat of Finance, which had an office on staffs and wages for salaried employees.

[71] V. A. Vlasov, *Sovetskii gosudarstvennyi apparat* (Soviet Government Apparatus), Moscow, 1959, pp. 176–77.

[72] *Sotsialisticheskii trud* (Socialist Labor), a monthly introduced in 1956, has carried many articles about proposed or actual changes in the wage structure. Most reforms apply to production workers who work on an hourly piece-rate basis or day-wage scale. Various wage scale networks for production workers are now being consolidated into a 6- or 7-grade system, instead of the earlier 8- or 9-grade systems. New wage norms, salary differentials, and bonus systems are introduced by administrative decrees, usually announced in Gosudarstvennyi Komitet Soveta Ministrov SSSR po Voprosam Truda i Zarabotnoi Platy, *Biuleten'*. There is also frequent discussion of new wage scales in the monthly publication of this state committee, *Trud i zarabotnaia plata* (Labor and Wages).

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The general aim of the wage reform appears to be not only a "streamlining" (*uporiadochenie*) of the many chaotically overlapping wage scale systems, but also a reduction of the wage differentials by pulling up the wage rates of the lowest paid categories and trimming slightly the top pay scales. The middle bracket of wage rates affecting the majority of workers seems to have been kept relatively unchanged. The directives of the Seven-Year Plan provide for the raising of the minimum wage from the present 270 rubles per month to 400 rubles by 1963 and possibly to 500 rubles by 1966 (providing, as all Soviet sources continually repeat, that the projected increments in the productivity of labor are fulfilled).[73] The fundamental principle of differentiated wages thus remains in effect, despite the attempt to narrow the spread between maximum and minimum wage rates.

Soviet sources are very explicit on the need to continue differential rewards. It has been stated recently that

> . . . the fundamental force in the training of highly qualified specialists consists in offering them material incentives. . . . The system of wages and the differentials in wages between industry sectors and various levels of production are of decisive significance in the rational utilization of specialists in the national economy. By fixing higher rewards for specialists employed in the decisive sectors of production, science, and culture, the Soviet state offers material incentives for recruitment into these jobs of specialists with the highest qualifications, and in this way assures the most rapid development of production, science, and culture.[74]

While this optimistic view still prompts Soviet planners to maintain wage differentials, there has been a continuous attack since 1956 upon excessive wage stimuli, particularly in academic and research careers. The crux of the problem has been stated as follows:

> It is high time that attention be drawn to the unhealthy disparity between the pay of scientists engaged in industrial research and those active in teaching and scientific research.
>
> How can it be regarded as normal that a professor or candidate degree holder, who is engaged in teaching or scientific research, receives twice or even three times as much pay as the chief engineer of an industrial plant, who is in charge of many thousands of employees, producing millions' worth of goods, and carrying tremendous personal responsibility?
>
> With all due respect to the teaching profession and for scientists engaged in research institutes, the inordinately high salaries of people who have advanced degrees cannot be justified. Important scientific research as well as inventions should of course be rewarded. But it is not just to brand as "important scientific research" all work performed by candidate or doctor degree holders, simply because they can display their advanced degrees.
>
> It is obvious that the existing pay scales for scientists do not promote, but in fact hinder, the development of science. This egalitarianism permits people who have stopped developing their intellect and those who just plainly do nothing (*bezdel'nik*) to hide behind the backs of true scientists. The existing pay scales give them the chance to live at the expense of "capital," of work which is done by truly productive scientists.
>
> Under the existing system of pay, more and more average people are entering the ranks of scientists. They are attracted not by the pursuit of scientific knowledge, but by the advantages which advanced degrees afford them. They are guided not by an insurmountable desire to engage in creative work, to serve people by their discoveries, but by the drive to lead a care-free life and benefit from the great benevolent aid which is given to science in our country.[75]

The excessive incentives which had been given to certain categories of Soviet professionals were reduced in 1957. On June 17 of that year the Minister of Higher Education ordered "revisions" of wage scales for academic and research personnel,[76] but the contents of the decree have not been made public. According to private information, the cut in pay amounted to 10 to 40 percent, depending upon the salary level: the higher the original salary, the more extensive the cut. But we are still uncertain about the exact wage scales for different types of academic personnel after the 1957 revisions.

This lack of knowledge stems from the fact that no systematic study of the wage structure for Soviet professionals has ever been made. Information on the Soviet salary structure is often brought by travelers returning from the Soviet Union, but these reports usually do not distinguish between "salary" as opposed to total

[73] *Pravda*, Nov. 14, 1958. Note that in January 1961 a new "heavy" ruble was introduced equalling 10 old rubles. Thus the 270 old rubles minimum wage now equal 27 new rubles.
[74] Komarov, *Ekonomicheskie osnovy*, p. 147.
[75] *Komsomol'skaia pravda*, Mar. 20, 1956, p. 2 (free translation of article by G. Babat *et al.*).
[76] *VyShkoSPR–1957*, p. 352.

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income, which includes all sorts of "extras," bonuses, premiums, royalties, and so forth.

Public criticism of overgenerous salary scales has not been limited to the academic and research fields only. For several years, the Soviet press has been decrying "excesses" (*izlishestva*) in managerial incentives and bonuses. It has, however, been reported recently that as a result of reforms, bonuses for managers of industrial enterprises may not exceed in any quarter 20 percent of the base salary. It is also understood that in the revised system of bonuses for managerial personnel, introduced in January 1960, the total bonus allotment must not exceed 10 percent of the wages fund for the respective salaried positions. According to this latest reform, an 0.1 percent reduction in the cost of production is to be rewarded by a 1.5 percent wage bonus, and a 1 percent overfullfillment of planned output will give the directors and top management of industrial enterprises a 5 percent wage bonus.[77] These rates are much less generous than those in the past, but they can still add substantially to the monthly base pay of industrial plant management.

While the bonuses and various other premiums augment wage differentials, they are not by any means their chief source. There are really three different wage scale systems for Soviet salaried employees. One is the general or basic salary group scale (*stavka*), which applies to general occupational categories (mail carriers, firemen, supporting personnel, etc.) and consists of a wage base from which certain plus or minus deviations are allowed, depending upon various factors, such as education, experience, location, and so forth. The second is the specific position salary (*dolzhnostnoi oklad*), which may vary from one enterprise to another, depending upon its administrative subordination, importance, location, etc. The third is the personal salary (*personalnyi oklad*), which is given only in recognition of specific personal qualifications. It is the first two of these which are usually discussed, for the third is a salary specially determined according to an individual's particular merit by the appropriate economic administration, with the specific consent of the Council of Ministers of the U.S.S.R. It is this "personal salary" which is the source of the largest wage differentials; for the top-echelon bureaucrats, plant directors, research institute heads, ministers and their deputies, and others who draw it generally earn incomes that are higher than those earned within the ordinary salary scales of the first two types for the same kind of job.

In order to clarify the nature of these three categories of wages for salaried employees, let us consider a hypothetical case. The base salary (*stavka*) for engineers is 1,000 to 1,350 rubles per month. If an engineer becomes a plant director, he could receive a "position salary" (*dolzhnostnoi oklad*) instead, ranging from 2,000 to 4,000 rubles per month. If such an engineer, now a plant director, is found to be a valuable administrator, he may be promoted into the "personal salary" (*personal'nyi oklad*) category, which will raise his salary by a certain amount not in excess of 3,000 rubles per month above the "position salary." In other words, an engineer—plant director on the personal salary scale could be paid 5,000 to 7,000 rubles per month.

Another example could be constructed as follows. A university professor's general salary scale is between 1,500 and 2,000 rubles per month, but the same professor without any administrative functions may for some reason of past performance receive a "personal salary" of 3,500 to 5,000 rubles per month. If this professor is appointed rector of a university, he could draw an actual "personal salary" of 4,000 to 5,000 rubles per month, rather than the normal university rector's "position salary" of 2,000 to 2,500 rubles per month. If the professor were to go even higher and be appointed a Deputy Minister of Higher Education, his salary would fall automatically into the "personal salary" scale and increase to 9,500 rubles. Now should he, for some reason, revert back to his status of ordinary professor with loss of "personal salary" status, then the general salary scale would again come into effect, and his wage would be 1,500 to 2,000 rubles per month.

It is important to note that the base wage (*stavka*) applies not only to salaried employees but to all types of production workers. In the case of the hourly-rate or day-rate pay scale, the base wage is the wage unit which serves as the base point in the construction of an intra-occupational grade scale (*razriad*) or industry sector

[77] For a discussion of the reform, see *Sotsialisticheskii trud*, No. 10, 1959, pp. 58–63.

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inter-occupational wage network (*setka*). Thus, the concept of basic wage exists for all categories of wage earners whether they are workers or employees.

It is also important to note that in addition to his wage—whatever wage category (general, position, or personal) may apply–a worker or employee may receive additional income in the form of bonuses, computed either in relation to his salary or as a flat rate. For example, an industrial plant manager may get bonuses in proportion to his salary depending upon the performance of the enterprise (fulfillment of output targets, cost saving, etc.). A director of a research establishment and some of his staff may receive a flat bonus for "research performed as scheduled." Then there are also commission fee arrangements. Thus an architect will receive a certain percentage of the estimated cost of his construction project; an inventor, a flat fee plus commission of a certain percentage of the savings in production costs directly attributable to the invention; a playwright, a percentage of the gate in the theaters where his play is staged. In the same category are writers who receive for their articles, textbooks, *belles lettres*, etc. payment differentiated by the type and length of publication, number of copies printed, and so forth.

There is also an additional consideration in regard to multiple job-holding: a person may hold a staff job in one institution and be a part-time employee in another. This is called *sovmestitel'stvo*, and is a fairly common arrangement in higher education and research institutions. The staff job pays the full salary, and each of the part-time jobs up to 50 percent of that salary. Some categories of Soviet professionals may thus substantially increase their earnings, though of course not all do.[78] Nevertheless, there are some Soviet professionals, and among these some professors, who are extremely well paid by Soviet standards, but the reports of uniformly high rewards for all Soviet professionals and all advanced degree holders must be considered in the proper perspective.

It is impossible to undertake here an exhaustive comparison between the professionals' salary scales and the wage rates of every category of production worker. But to gain some idea of wage differentials, a summary compilation of wage data has been undertaken and is presented in appendix VI–W. In order to make sense of individual wage quotations, it is necessary to devise a reference point, so that an index of wage differentials can be constructed. (Obviously, a conversion of Soviet wage figures into dollar terms would be unsatisfactory.) To ascertain the degree of pay differentials, it was found convenient to use the average wage of all workers and employees (excluding collective farmers and some artisans) as a base for comparisons. According to the best available calculations, this average wage was 710 rubles per month in 1955.[79] It is possible that in the last 5 years the average Soviet wage has risen by 10 to 12 percent, approaching at the present time about 800 rubles per month. Since the wage quotations summarized in appendix VI–W refer to slightly different dates of reporting in the mid-1950's, no adjustment of the average wage was made and the 1955 average wage level was used as a base for the index.

Table VI–81 summarizes the data in appendix VI–W. It is obvious that the often-expressed opinion that Soviet professional salaries are uniformly high and that they are several times higher than the average earnings of workers and employees appears totally unfounded. The salaries for primary school teachers are below the average wage. The salaries of secondary school teachers, ordinary medical doctors and agricultural professionals are barely on a par with the average wage. Such people do not fare much better than white-collar office employees.

School directors and directors of medical establishments get salaries somewhat above the average wage, but they are well within the range of the wages paid to skilled production workers. The majority of *ETMP* jobs are also slightly above the average wage; the average wage of engineering and technical personnel in production units is about 1.65 times that for production workers.

[78] This last qualification was exemplified by a Soviet university professor on a 1959 visit to the United States. When asked how he enjoyed being in a high income bracket, he replied: "I am a simple botanist. I have been teaching at the university for the last 20 years and receiving 2,200 rubles per month ever since I was made a professor. Two years ago [i.e., in 1957] they cut my salary by 300 rubles. I have one job. Even if I wanted to teach more, nobody wants botanists in a big city. Besides, I'd rather go fishing. My wife is a physician and we have enough to be comfortable."

[79] Hoeffding and Nimitz, *op. cit.*, p. 73.

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TABLE VI–81.—*Approximate wage scale for various Soviet occupations as of the mid-1950's*

Comparative level of wages	Average monthly wage index	Occupations
Minimum wage*	40	Charwomen in educational establishments; laboratory aides.
Very low	41–60	Junior service personnel in education and medicine; junior laboratory technicians; auxiliary hospital personnel.
Below average	61–80	Preschool teachers; elementary teachers (gr. 1–4); senior laboratory technicians; librarians; medical nurses and assistant physicians and other semiprofessional medical personnel (average wage index of all workers and employees in public health—76); veterinary technicians; brickyard workers; semiskilled workers in manufacturing industries.
Average**	81–120	Secondary school teachers (gr. 5–10); elementary school directors (average wage index for all workers and employees in education—84); practicing physicians without administrative functions; agronomists and veterinarians; junior teaching personnel in higher education without advanced degrees; business managers of higher educational establishments; office employees in industrial enterprises (average wage index—88).
Above average	121–170	Secondary school (7- and 10-year school) directors; senior librarians, editors and translators; junior research workers; chief physicians and directors of medical establishments; ordinary engineers, designers, economists; industrial technicians (average wage index—165); majority of *ETMP* jobs without high administrative function; skilled production workers in manufacturing industries.
High	171–400	Professors and associate professors in higher education, with or without advanced degrees; directors and deputy directors of higher educational establishments; library directors; persons with candidate degree not employed in academic or research jobs; coal miners; production foremen, production engineers, shift engineers, etc.; directors of research establishments; senior research workers; senior engineers and chief engineers in metallurgical plants; persons with advanced degrees employed in academic or research jobs; high-skilled production workers (mostly piece-rate) in manufacturing and mining.
Very high	401–700	Some directors of research institutes of the Academy of Sciences; some directors of polytechnical institutes; administrative and executive personnel of medium-size industrial enterprises; directors, chief engineers, assistant directors of large metallurgical plants.
Extremely high	700 and over	Select professors in higher education and research; academicians; some directors of research institutes of the Academy of Sciences; Deputy Minister of Higher Education; executives and managers of large industrial enterprises.

* Minimum wage 40–270 rubles per month, which applies to Soviet workers and employees. The income of collective farmers is not taken into consideration here, but it is substantially lower (counting both money and income in kind) than that of Soviet wage earners.

** Average wage 100–710 rubles per month.

Source: Appendix table VI–W; text tables VI–82 and VI–83.

One peculiarity of *ETMP* wages is that, unlike primary and secondary school teachers, physicians or agronomists, there is within this category of employment very wide variation of salary scales. This variation is shown clearly by the ratios between *ETMP* average salaries and wages paid to production workers in selected sectors of Soviet industry as of 1956:[80]

Index of Wages Paid ETMP in Relation to Those Paid Production Workers

Mining, nonferrous ores	240	Hosiery and knit goods	135
Mining, ferrous ores	170	Cotton-cleaning	115
Mining, coal	160	Leather	120
Lumber-timber	150	Fish processing	200
Machine building	150	Fruit processing	180
Cotton spinning	160	Meat processing	160
Wool spinning	140	Dairy processing	130

[80] A. G. Aganbegian and V. F. Maier, *Zarobotnaia plata v SSSR* (Wages in the U.S.S.R.), Moscow, 1959, p. 202.

Table VI–82 presents other data for 1956, which indicate how much *ETMP* wages vary between various Soviet enterprises.

Another peculiarity of the *ETMP* wage structure is the considerable narrowing of the *ETMP* wage differential in relation to production workers, over a period of time, as indicated by the data in table VI–83.

In addition to the average monthly wage, *ETMP* bonuses could account for from 20 to 50 percent above the base pay.[81] This would of course be a substantial addition to the wage differentials which does not enter into the calcu-

[81] E. L. Manevich, *Zarabotnaia plata i ee formy v promyshlennosti SSSR* (Wages and Their Forms in the Industry of the U.S.S.R.), Moscow, 1951, esp. p. 192.

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TABLE VI–82.—*Average monthly wages and wage relatives of production workers, ETMP, and white-collar office employees in select Soviet manufacturing and mining enterprises, 1956*

Type of enterprise	Production workers		Index of wages of white-collar office employees in relation to workers (percent of B)	Index of *ETMP* wages in relation to workers (percent of B)	Average monthly *ETMP* wage (rubles)	Differentials in *ETMP* wages by plant
	Average wage of all production workers (rubles)	Base index				
	A	B	C	D	E	F
Machine building plant A (First Ballbearing Plant)	970	100	88	150	1,120	100
Machine building plant B (Moscow Carburetor)	795	100	85	147	1,170	105
Petroleum enterprise (Tatar Petroleum):						
Extraction	757	100	92	190	1,440	129
Drilling	995	100	68	160	1,590	142
Machine building plant C (Moscow's "*Derp i molot*," heavy engineering)	1,090	100	70	163	1,780	159
Coal mining enterprise (Kuzbas Coal)	1,240	100	62	162	1,997	179

A—Average monthly wages of all production workers in a given plant.

C, D—Relatives based on ratio of average monthly wage of white-collar employees and *ETMP* to average monthly wage of production workers, in percent of Col. B.

E—Actual average monthly wage of *ETMP* (exclusive of premia and production bonuses)

F—Differential in percent of lowest average monthly wage of *ETMP* (1,120=100).

Source: Komarov, *Ekonomicheskie osnovy*, pp. 151, 155.

TABLE VI–83.—*Historical trend in the wage relatives of ETMP, production workers and white-collar office employees in Soviet industry*

[In percent]

	1935	1940	1950	1955
Production workers	100	100	100	100
White-collar office employees (in relation to production workers)	126	109	93	88
ETMP (in relation to production workers)	236	210	175	165

Source: Aganbegian and Maier, *op. cit.*, p. 202.

lations of average wage relatives for *ETMP* and production workers indicated above.[82]

As indicated by the data in appendix VI–W and table VI–81, academic and research personnel wages fall largely within a 1.7- to fourfold differential above the average wage of workers and employees. It is conceivable, as an exception, however, that some professors may earn over 7 times the average wage. Most of the senior research executives (directors of research establishments) draw salaries 4 to 7 times the average wage. Only three top-echelon jobs were identified in the academic and research administration field, which showed salaries that were 8, 11, and 13 times the average wage. A plant director's *personal* salary (i.e., the position salary of 5,000 rubles per month plus a personal differential of 3,000 rubles a month) adds up to a salary over 11 times as large as the average wage and is also in the same bracket. In the latter case, however, additional premia and production bonuses are almost a certainty.

The wages discussed above show a differential which would be even more pronounced if we could analyze data on total incomes for various occupations. Obviously, a Soviet elementary school teacher, agronomist or physician must rely mainly upon their base salary and cannot expect to increase their incomes by any significant amount through other types of activities. On the other hand, research and academic personnel in higher education and research establishments may engage in multiple-job holdings, in consulting, in textbook writing, etc. Industrial managers and engineering personnel may receive various bonuses for increasing output or decreasing the costs of production. The relevant

[82] For a discussion of wage differentials for *ETMP* in the 1930's, see M. Yanowitch, "Trends in Differentials between Salaried Personnel and Wage Workers in Soviet Industry," *Soviet Studies*, vol. XI, No. 3 (January 1960), 229–52.

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consideration is that such personnel already enjoy wages higher than average and it is they who can increase their incomes further; while those in ordinary professional and semiprofessional jobs must rely mainly upon their base salaries, which as a rule are within the average wage bracket.

At the beginning of this section, the question was raised whether it really paid to be a professional in the U.S.S.R. The summary answer would seem to be that engineering, industrial management, academic and research careers, and top research or academic administration positions are indeed the areas of significantly higher than average pay. School teaching, medicine and agriculture are fields of professional specialization where the pay is just on par with or even somewhat below the average wage. (It is worth mentioning again that in medicine and education, which are the lowest-paid professional fields, women predominate.) High wage incentives are a clear reflection of the high priority engineering, scientific and academic-research careers enjoy in the Soviet state.

In order to promote the quality and prestige of scientific research, technological invention, art and literature, the Soviet regime has established various other nonmonetary incentives. For example, life-time honorific titles, such as "Esteemed Teacher," "Esteemed Actor," or "Esteemed Researcher" are awarded for outstanding performance in the respective fields; they entail minor privileges and a modest pay differential. Similarly, medals of distinction are awarded for special accomplishment or simply for long years of service. There are a dozen different kinds of such medals, each of which entitles the holder to some privilege or honor (ranging from free rides in public conveyances to the erection of monuments and honorific monthly payments).

The third such device are the annual awards of very considerable cash prizes (up to 50,000 rubles) with the title "Laureate," and lesser awards of gold or silver medals, named after some prominent scientist, writer or artist. The medals are usually accompanied by a cash prize (10,000 rubles or less). Hundreds of the lesser prizes are awarded annually by the Academy of Sciences of the U.S.S.R., by other academies, and by professional associations.

The best known prizes are the annual Lenin (formerly Stalin) Awards, which are the most lucrative of all. Established in 1939 by the Soviet Government for excellence in the fields of science, technology, literature, the arts and military affairs,[83] these prizes originally ranged from 25,000 to 100,000 rubles each. After de-Stalinization in 1956, the Stalin Awards were renamed after Lenin,[84] and 50 of these prizes of 75,000 rubles each have been awarded annually since that time.

A large majority of all the awards, medals, and titles are reserved for the fields of science and technology. Soviet planners miss no opportunity to express their preference for the kind of endeavor which they think counts most in furthering Soviet power objectives.

[83] *VyShkoSPR–1948*, pp. 261–67.
[84] *VyShkoSPR–1957*, pp. 272–74.

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Postscript

Over the last four decades in the Soviet Union, neither education nor research has been an ivory tower, isolated from society. Soviet education, from preschool to research training for advanced degrees, owes its existence to and sets its goals by the society it is called upon to serve. It is but a means to an end: to maximize the economic and political power of the Soviet regime and to strengthen thereby its international position in the struggle to establish communism throughout the world. These aims have remained unaltered since the days of the Revolution; only the tactical methods for implementing them have changed from time to time.

The development of Soviet education and specialized manpower resources should be viewed mainly in the context of total communist advances—political, economic, social and cultural. There is a much closer integration of educational and manpower policies with economic and political objectives in the Soviet totalitarian society than in other modern industrial nations whose policies are based on pluralistic values. Soviet education derives its strength and, by the same token, its weaknesses, from the fact that it is centrally planned and directed by the state, which imposes norms of conformity upon the individual. The individual may not ask for education of his own choosing. The state sets enrollment quotas for each level of education and each specialized field in accordance with its national objectives, determines the content of instruction, the size of staffs, and the kind of facilities.

In order to direct the development along desired lines, the Soviet Government finances its entire educational effort from the national budget, legislates educational reforms in accordance with the planners' preferences, and prescribes the administrative practices and educational policies. When economic considerations dictate a greater need for skilled manpower, the educational system is adjusted accordingly. When strategic considerations dictate the need for developing specialists in certain fields of science or applied technology, the appropriate resources are made available to stimulate such efforts, and the manpower policies and educational process are adjusted accordingly. The state wants to develop individual talent, which it selects not only by academic but also by political criteria, and molds it to suit its needs. The individual is allowed to develop his intellectual capacity and professional skill only along the lines set by the planners.

In the Soviet Union a high premium is placed upon technical and specialized, rather than general, excellence. Science and technology are particularly recognized as the foundation of national strength, and consequently they receive emphasis on all levels of the educational effort. Secondary schooling provides the base for early (and mandatory) exposure to the sciences and technology, from which select individuals are chosen for professional education. The quality of Soviet professional training in scientific, engineering and applied fields today is, on substantive grounds, comparable to that offered in the West. This is not true, however, of all fields—especially where political intervention is heavily felt or where exclusively applied objectives prevail.

Many qualitative reservations, however, become less significant in view of the quantitative gains made by Soviet professional education over the last three decades. The planners have succeeded in increasing spectacularly the rate of producing specialists. Higher education is still accessible to a substantially smaller proportion of the Soviet population than is the case in the United States. Instead of making higher educational opportunity widely available, the Soviet regime has concentrated its efforts on the development of the specialized manpower needed

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to further its long-run economic and military goals. As a result, in recent years the number of higher education graduates in the sciences and various applied fields—engineering, agriculture, and medicine—has exceeded substantially (by a factor of two or three to one) the rate of training such specialists in the United States.

The current Soviet educational reforms have tipped the Soviet educational effort further in the direction of science and technology. Applied technical training has been added to the secondary school curriculum, in addition to the traditional academic subjects of science, mathematics, and other basic disciplines. Likewise, in higher education, applied training will be further stressed, although certain strategic fields in the sciences and engineering will continue to require a strong theoretical preparation as well. The high rate of training professional specialists, particularly those in science and engineering, will undoubtedly continue.

The professional specialist has completely overshadowed the generalist in Soviet society. Soviet specialists are employed not only in the occupations for which they were trained, but to a degree unknown in the West, in managerial and administrative positions in the economic, social, and even political affairs of the state. Soviet engineers manage industry; physicians run hospitals and public-health services; teachers are school administrators; agronomists administer agriculture; and scientists guide the research effort. In this way, a substantial proportion of professional specialists are integrated into the decision-making mechanism of the Soviet state. They do not reach executive positions on the basis of professional merit alone, however, but also through a process of careful political screening by the Communist Party. The careers of Soviet specialists are shaped not only by the education they receive, but frequently by the loyalty and service which they render to the regime. In return for this service, they are paid well, in relation to the average wage, and their status in society is high.

Soviet gains in developing specialized professional manpower, however, have been made at the expense of broad higher educational opportunities in other areas–the arts, humanities and social sciences. While the utility of a technical specialist to society is undeniable, the preparation of the Soviet specialist, with his lack of humanistic education and disregard for the cultural, ethical and social values cherished by the West, limits him in participating in the solution of the important social and political problems which divide the Soviet Union and the democratic world today.

In Soviet higher education, the development of professional competence and technical rationality is divorced, perhaps quite deliberately, from the acquisition of broad humanistic values, a fact which makes the Soviet professional a tool, witting or unwitting, in serving the aims of the communist regime. Soviet higher education succeeds in developing the human mind to the point of high competence in many areas, but deprives it of its potential to exercise independent and creative thought in the sphere of social values. The social aims and political goals were, and continue to be, shaped by Soviet rulers, who are communist strategists first and technical specialists second. If the aim of education is to develop a creative intellect critical of society and its values, then Soviet higher education is an obvious failure. If its aim is to develop applied professional skills enabling the individual to perform specialized, functional tasks, then Soviet higher education is unquestionably a success, posing not only a temporary challenge, but a major threat in the long-run struggle between democracy and totalitarianism.

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Appendix to Introduction

A Note on the Difficulties Encountered in Working with Soviet Educational and Manpower Statistics

The question of the reliability of Soviet educational statistics seems to be a major one, and it requires some general discussion.

Among experts on the Soviet Union, there is a general consensus that in spite of some "fairy tales," some official exaggerations and distortions, it is possible to penetrate Soviet data. Soviet statistical data, especially for unwary users, are full of "perplexities and pitfalls," which "must be considered among the very basic difficulties in the way of getting facts about Russia."[1] Despite "many harassing deficiencies, it seems that the Soviet Government does not falsify those statistics which it elects to publish."[2] In other words, "contrary to common supposition, the Russians seem generally not to resort to falsification in the sense of free invention and double bookkeeping."[3] It is commonly agreed that data obtained from official Soviet pronouncements and statistical publications have some meaning and significance. This, of course, does not preclude the use of statistical data for a "propagandistic presentation—a form of art in which lies of various dimensions may enter."[4] There is undoubtedly some bias in certain Soviet statistical series, especially those which "have developed with the passage of time and been allowed to continue uncorrected for an extended period."[5] Such are the opinions of experts in regard to Soviet statistical data in general.

In regard to Soviet educational and professional manpower statistics, it may be stated that in the course of many years of research, evidence of out-and-out fraud was not found. There is, of course, occasional juggling with statistics; there is the problem of changing definitions; there are occasional ambiguities as to dates of reporting; and there are some sudden aggregations of distinct categories in order to conceal unfavorable trends or to give Soviet propaganda a chance at otherwise unjustified claims of extraordinary success. Despite this, the data mirror the real situation to a great extent. Many checks were made, and by and large it appears that for some years where abundant data exist, they are as accurate as Soviet compilation procedures and information-gathering techniques permit. What was found on educational statistics was often better and more reliable than data in certain other fields of statistical research on the Soviet Union.

What significance does this have? Professor Gerschenkron put it well when he stated that if research was to be based on admittedly deficient information, "counsels of pedantic purity are not necessarily the most helpful ones. At least, the present writer cannot decide to follow them at the price of foregoing acquisition of such little and uncertain knowledge as may result from preoccupation with admittedly poor and inaccurate Soviet materials."[6] In this research undertaking we have tried to follow this advice.

In pursuing this task it must be realized first that there is a great difference between statistics which are compiled for internal use by various departments of the Soviet Government and those which are obtainable from published Soviet sources. For internal use, the compilation of economic,[7] educational[8] and employment[9] statistics in the Soviet Union is indeed most extensive and thorough. But only on rare occasions do we get a glance at statistics compiled for internal use.[10] Most comprehensive statistical series remain largely classified under the provisions of the Soviet state se-

[1] A. Bergson, "A Problem in Soviet Statistics," *The Review of Economics and Statistics*, Vol. XXIX, No. 4 (Nov. 1947), 234.
[2] *Idem.*
[3] A. Bergson, "Reliability and Usability of Soviet Statistics," A Symposium, reprinted from *The American Statistician*, June-July 1953, 19.
[4] S. A. Rice, "Statistics in the Soviet Union," *The Bulletin of the Atomic Scientists*, Vol. VIII, No. 5 (June 1952), 159.
[5] *Ibid.*, 160.
[6] A. Gerschenkron, *A Dollar Index of Soviet Machinery Output, 1927–28 to 1937*, Santa Monica: The Rand Corporation, 1951, p. 24.
[7] G. Grossman, "Working Memorandum on the System for Collecting and Processing Industrial Statistics in the Soviet Union; Its Effect on the Reliability of Data," New York: National Bureau of Economic Research, July 1, 1956 (mimeo.).
[8] I. Z. Kaganovich, *Ocherk razvitiia statistiki shkol'nogo obrazovaniia v SSSR* (Survey of the Development of Statistics on School Education in the U.S.S.R.), Moscow, 1957.
[9] M. Feshbach, *The Soviet Statistical System: Labor Force Recordkeeping and Reporting*, International Population Statistics Reports, Series P-90, No. 12, Washington, D.C.: U.S. Department of Commerce, Bureau of the Census, 1960.
[10] Such as *Plan 1941*.

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crets law.[11] Under its provisions, much vital data and many significant economic series are concealed not only from outside observers but from the Soviet people as well.

For the most part, factual data and statistical information on the Soviet Union are abstracted from various published sources. There are three periods which can be distinguished in the flow of Soviet published data. The first period is prior to 1937, when a relatively abundant supply of statistical handbooks was released by the Soviet Government. The second period is from 1937 to 1956, when statistical handbooks were not published though periodic releases of information were made, which were often cast in the enigmatic language of percentages.

This external flow of information often lacked refinement and orderly sequence. It was painfully pieced together, labored over for possible checks on consistency, and searched through for ambiguities, changes in definitions, and various "tricks of the trade" resulting from substitution of fragmentary reporting for the comprehensive release of statistical information. The preparation of *SPM* was carried out under these conditions.

The year 1956 marks the beginning of the third phase, when the publication of statistical handbooks was resumed. Most of the statistics in these handbooks, however, are significantly less detailed and more censored than was the case in the 1930's. Despite the great publicity associated with the release of Soviet statistics in the years since 1956 and despite the admitted fact that these statistical releases by the Soviet Government have enriched the availability of data for research, it is evident that in the fields of education, manpower and employment, the statistics which have been released so far are very meager and in fact still quite poor. The reason for the release of the new statistics is 2-fold. Undoubtedly the excessive secrecy which prevailed for some 20 years hamstrung research into economic problems by Soviet research and academic personnel, and discussion of vital economic issues was severely handicapped. The official release of statistics helps to overcome these deficiencies. The second reason is to intensify a propaganda campaign which "would show the Soviet scene in a rosy light."[12]

The statistical indices released were very carefully censored by Soviet authorities. Often data are given in aggregates. There are also many gaps in reporting any given statistical series, and at times entire series which would allow proper analysis of the data were deliberately withheld. One obvious example, among many, is the lack of comprehensive reporting of detailed employment statistics and wage data.

The task of Western analysts of the Soviet scene has not become any easier as a result of the recent releases of Soviet statistics. If anything, their efforts have been made somewhat more trying. More data are floating around than in the preceding two decades. There is a natural tendency to rely upon them "as is" without embarking upon further research to ascertain their comprehensiveness. The choices of statistics and the avenues of research are now more abundant, but these alternatives make inquiry more exasperating; for the very reliance upon censored statistics often leads to the greatest pitfall of all: statistical proof of the allegedly untarnished successes of the Soviet system.

Obviously, in order to comprehend Soviet reality, balanced effort is needed. Scholarship is made a sham if Soviet statistics—and other sources of descriptive information—are not used to show the dark side of the moon as well as the bright one.

It is not our task to examine in detail the quality and accuracy of all reported data and statistical series appearing in Soviet releases. We can only point out some of the pitfalls and "tricks of the trade" encountered during the course of the research. In the long run, Soviet educational statistics seem to be fairly consistent, but at times they appear ambiguous and some juggling can be observed. This juggling takes place when a certain unfavorable trend becomes apparent. For example, when enrollment began to fall off in higher educational establishments in the mid-1930's, Soviet statistical sources began to include enrollment in the Higher Communist Party Schools in the totals. The same was done to boost the totals of graduations. Once enrollment was again on the upgrade, toward the end of the 1930's, there was no need to smooth the curve and cover up the real drop in enrollment, and so the party schools were again excluded from the totals and carried separately.

While in the prewar period enrollment and graduation series were biased by the inclusion of party schools in the category of higher educational establishments, in the postwar period Soviet statistical series were biased by the enormous expansion of extension-correspondence training (*zaochnoe obuchenie*). It is worth noting, however, that the "lumping" of extension-correspondence students with regular students in official pronouncements became standard procedure in the years after 1949 only. The inclusion of extension-correspondence students in statistical series is, of course, quite a handy device; for it creates, at least on the surface, an extremely favorable impression of the enormous expansion of Soviet higher education in the postwar period. Furthermore, such inclusion helps to conceal the ups and downs in graduating classes from regular training establishments.

It is stated in one of the recent statistical handbooks (*KS–1956*) that extension-correspondence training began to be recognized in 1938 (actually the first data appear for 1939). It explains that

[11] For a convenient translation of the State Secrets Law of 1956, see Gorokhoff, *Publishing*, pp. 258–60.

[12] U.S. Dept. of State, "Soviet Statistical Claims," *Soviet Affairs Notes*, No. 228, Washington, D.C., Dec. 29, 1958.

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extension-correspondence training in Soviet higher education (and also semiprofessional schools) before 1938 was regarded as "course training" (*kursovaia podgotovka*), and only after that year was it recognized as equivalent to regular education because of the introduction of examinations, defense of diploma thesis, etc. for extension-correspondence students. Although the statistical handbook explains this exclusion of extension-correspondence students before 1938 and their inclusion after 1938 on these formal grounds (Council of People's Commissariats, decree of August 29, 1938), the problem still remains that in the pre-1938 period at least some graduates with "course training" were most likely counted as higher education graduates, even though their number was not great.

The problem of including extension-correspondence students and graduates in the totals is particularly significant in the postwar period. The fact is that since Soviet pronouncements often talk about numerical rates of growth, such inclusion is a handy device for showing a more advantageous picture than there would be if no aggregation was made. Regular enrollment in Soviet higher education barely doubled in the course of 18 years (1938: 620,000; 1955: 1,220,000), while the inclusion of extension-correspondence students in the totals indicates more than a 3-fold increase (1938: 620,000; 1955: c. 1,870,000). The same applies even more so to graduations where the increase, net of extension-correspondence students, would be only 80 percent (1938–55) but with extension-correspondence graduates included is about 2.5-fold.

In addition to the question of extension-correspondence students, it must be noted that the new statistical handbooks often aggregate with regular day students and graduates those who are enrolled in or have been graduated from evening divisions. In the past there was some uncertainty where evening students were counted. In most cases Soviet official pronouncements and various sources have counted these students as extension-correspondence students, which is more reasonable than the new procedure of including them with regular students. However questionable this procedure may be, the fact remains that some sources define day and evening students as regular students, others count them separately. As the campaign to glorify extension-correspondence training has been expanding in recent years, many reports have been issued which lumped evening and extension-correspondence students together. As a result, the researcher has to be on the continuing lookout as to the consistency of the reporting categories.

There is further the problem of inclusion or exclusion of certain categories in graduations by field. For example, prior to 1931, mechanical engineers on the maintenance of agricultural equipment were included in the industrial (i.e., engineering) category, but later on they appear together with agricultural specialists. "Engineer-economists" prior to 1932 were also lumped together with engineers, and thereafter with "economists" (i.e., socioeconomic segment). In the postwar years again some engineering economists were aggregated with engineering-industrial professionals.

A further complication in working with Soviet educational statistics arises in regard to professionals graduating from universities. Until 1931 the various faculties of universities were allied with the fields of their respective specializations. Thus medical students appear under the health category, and certain engineers under the industrial category, etc. After 1931, however, graduates of universities are lumped under the heading "education."

Juggling with primary and secondary school enrollment data is another example. After 1949, when enrollment began to fall off in the elementary grades, primary and secondary school enrollment began to be "lumped" together with technicum enrollment and with enrollment of students in other than regular secondary schools (extension-correspondence, schools for working and rural youth, etc.). Some of the ambiguities resulting therefrom were belabored in *SPM*. The new statistical handbooks confirmed the enormous decline in school enrollments which took place during the 1950's and had been indicated through estimates in *SPM*. But, now, as a result of the educational reform, still other problems emerge. The projected 1965 enrollments, in the upper grades for example, represent an aggregation of both regular and part-time schooling, while these figures are compared in Soviet pronouncements with figures for regular full-time schooling only in the 1950's. These deceptive comparisons are obviously made to advance the Soviet claim that upper secondary schooling will advance, while in reality its actual full-time equivalent may not expand at all during the current 7-Year-Plan.

A further example of interest may be found in regard to preschool education. Here again aggregation of distinct reporting categories was observed. There are two distinct statistical concepts. One is "permanent places" (*postoiannye mesta,* also referred to as "beds"—*razvernutye koiki,* the latter 5-10 percent less than the number of places in creches). The other concept is seasonal attendance (*sezonnye*). The first reporting category tells us the maximum number of places available, below which the actual number of infants cared for or children enrolled fluctuates from day to day. Soviet sources have consistently censored information about *actual* attendance (*zapolniaemost'*), though we still have a sufficiently meaningful definition of maximum available places in nursery schools and creches.

The other concept, i.e., "seasonal nursery schools" and "seasonal creches," is used to report the number of children cared for or attending on

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a "maximum attendance day." Both seasonal creches and nursery schools are particularly prominent in rural areas at the height of seasonal activities. These maximum attendance days are different for different institutions and thus the entire concept is questionable. Moreover, when there are seasonal fluctuations, nursery school attendance and seasonal creche places are lumped together with permanent places and the entire statistic thus becomes questionable. Interestingly enough, this deception underlies Stalin's statements concerning the extensive development of preschool facilities in the 1930's, when he referred to preschool education, including seasonal facilities for the late 1930's but excluding them for the early 1930's.

A similar deception is now being perpetrated in regard to boarding schools. As originally postulated, boarding schools were to be 24-hour child care facilities. In the context of the educational reform, however, enrollment in extended day schools (the children have lunch at school but spend the night at home) was aggregated with boarding school enrollment, which makes the projected figures for "boarding schools" in the 1960's hybrid ones and entirely different from the statistics reported for boarding schools proper in 1956 and 1957.

There is frequently also some ambiguity concerning the date of the survey for which statistics are given. Some censuses of students in higher educational establishments refer to "October 15," some to "December 1," and some to "January 1" within a given academic year. Some sources simply state the year "1937," and one must do some investigating to find out whether this means average yearly, year-end, or year-entry figures. There are also ambiguities as to distribution of students by field. For example, for the year 1934 one can find eight different sets of figures which add up to approximately the same total but are different in breakdown. This is apparently because of the reorganization of institutes which took place in that year. In the postwar period it becomes a formidable task to cope with figures on graduates by field because of ambiguity concerning what is or is not included in "residual" after specific categories of graduates have been singled out.

There is also the problem of approximations, which for the prewar period is not particularly grave, but which becomes quite serious for the postwar years. Directly related to this is the problem of using "preliminary reporting" figures. Often only one set of figures is available, and the use of "preliminary reporting" figures becomes unavoidable as the closest possible approximation of the actual situation.

In addition, there is the problem of professionals who are censored out of statistics. Those who are definitely censored out are military (both army and NKVD) specialists. The concept of "professionals in the national economy" prior to 1932 was constructed in such a way that it censored out education and health specialists. Afterwards professionals in these two occupational groups were embodied in the concept of "professionals in the national economy." But throughout the years, professionals with higher education in military affairs are excluded. This fact was revealed by the 1939 and 1959 census figures for professionals. There is some uncertainty also as to whether graduates of "special departments" (faculties which train military professionals in civilian higher educational establishments) appear in the totals by field or whether they also are censored out.

Again, there is the problem of the outright suppression of statistics. This problem seems to crop up in cases where a certain trend is in reverse. For example, it is obvious that the 1932 figure for the social and sex composition of students in higher educational establishments was such as to reveal an extremely large proportion of workers by origin and women respectively. Sometime in 1934 Soviet statisticians decided to change the concept of the social category "workers by origin" to "workers or their descendants by origin." This change again can be explained on the basis of a desire to bias the picture in the sense that the share of workers by origin among professionals and among students had begun to decline and in order to bolster the trend the concept was modified. Despite this, in subsequent years we observe a downward trend in the proportion of workers, and apparently the publication of figures after 1938 began to look unfavorable propaganda-wise. In order to save embarrassment, these statistics were simply suppressed in all later publications. As evidenced by the current reporting forms and by Khrushchev's own recent pronouncement, these statistics are regularly compiled, but their public release is withheld.

Regardless of these and many other considerations, it is still possible to abstract quite meaningful and consistent data, at least as far as aggregates are concerned. Where discrepancies are minor (such as December 1 or January 1 figures), they may simply be overlooked. In many cases, since no other data are available anyway, there is very little that can be done to adjust certain discrepancies (for example, the problem of "engineer-economists" or the change in concept of "workers by origin"). During the preparation of this study, careful checks of Soviet official sources were made and a large number of ambiguities were resolved. Among statistics which offered some choice, only those which appeared to be most reliable were selected (such as consistency on date of census, exclusion of party schools, attempts to total the breakdowns, etc.).

In conclusion, it should be noted that any set of social statistics cannot reflect the precision which is expected from data in, say, physics or engineering. The dynamics of social change are so complex that

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one has to be satisfied when a certain trend can be established or confirmed with reliability and consistency, rather than when a finding is made which states that a few thousand trained engineers are economists who are engaged not in production but in management.

Throughout the study, when a certain bias in a statistical series, when some shift in definition, etc. was observed, every attempt was made to clarify the implication behind it. Most of these observations are noted in the appendices and the text.

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Appendix to Chapter I

Appendix I–ERL.—Soviet Laws on the School Reform: Comparative Review of Legislative Decrees on Educational Reform for the U.S.S.R., the Russian SFSR and the 14 Other Union Republics

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APPENDIX I-ERL.—*Soviet Laws on the School Reform: Comparative Review of Legislative Decrees on Educational Reform for the U.S.S.R., the Russian SFSR and the 14 Other Union Republics*[1]

An assessment of the Soviet educational reform is aided significantly by a detailed examination of the legislative acts concerning the reform in all the union republics. This appendix presents a review of the educational reform laws approved by the U.S.S.R.'s Supreme Soviet, the Supreme Soviet of the Russian SFSR, and the Supreme Soviets of the other 14 constituent republics. The legislative session of the Supreme Soviet of the U.S.S.R. was held at the end of December 1958, and the sessions of the Supreme Soviets of the union republics met in the spring of 1959. The proceedings of these sessions were reported in the Soviet press and the analysis in this appendix is based on the following sources:

Russian SFSR: *Sovetskaia Rossiia,* April 17, 1959, pp. 3–4.
U.S.S.R.: *Pravda,* December 25, 1958, pp. 1–2.
Ukraine:[2] *Pravda Ukrainy,* April 19, 1959, pp. 2–3.
Armenia: *Kommunist,* April 21, 1959, pp. 2–4.
Azerbaidzhan: *Bakinskii rabochii,* April 2, 1959, pp. 1–2.
Belorussia: *Sovetskaia Belorussiia,* April 12, 1959, pp. 3–4.
Estonia: *Sovetskaia Estoniia,* April 29, 1959, pp. 1–2.
Georgia: *Zaria vostoka,* April 21, 1959, p. 2.
Kazakhstan: *Kazakhstanskaia pravda,* March 29, 1959, pp. 2–3.
Kirgizia: *Sovetskaia Kirgiziia,* June 2, 1959, pp. 2–3.
Latvia: *Sovetskaia Latviia,* March 20, 1959, pp. 1–2.
Lithuania: *Sovetskaia Litva,* April 26, 1959, pp. 1–2.
Moldavia: *Sovetskaia Moldaviia,* April 19, 1959, pp. 2–3.
Tadzhikistan: *Kommunist Tadzhikistana,* April 5, 1959, pp. 1–2.
Turkmenia: *Turkmenskaia iskra,* April 30, 1959, pp. 1–2.
Uzbekistan: *Pravda vostoka,* April 7, 1959, pp. 1–3.

In the course of the examination of the texts of law for each republic, it was discovered that most of them have a closer resemblance to the Russian SFSR law than to the U.S.S.R. law.[3] Therefore the comparison below of the individual articles of the educational reform law in the union republics and the U.S.S.R. was made with the specific articles of the RSFSR law. Despite the similarity of the actual articles of the law, the introductory preambles differ somewhat in wording and arrangement of paragraphs, but not in basic content. All preambles of union republic laws, including that of the RSFSR, contain some passages of the U.S.S.R.'s law verbatim and then add local color by referring to pertinent statistics for the republic or by stressing some national aspects of the "cultural revolution" which have taken place. Aside from this, however, the overall aim of the school reform is best conveyed by the preamble to the U.S.S.R.'s Educational Reform Law, the translation of which is as follows:[4]

Law on Strengthening Ties Between School and Life and on Further Developing the Public Education System in the U.S.S.R.

The U.S.S.R. Supreme Soviet notes that the question of strengthening the ties between school and life and further developing the country's public education system submitted by the Party Central Committee and the U.S.S.R. Council of Ministers to the U.S.S.R. Supreme Soviet for consideration is of exceptional importance for successfully carrying out the task of building communism.

The nationwide discussion of this question has shown that the program drawn up by the Party Central Committee and the U.S.S.R. Council of Ministers for further developing the public education system has met with the unanimous approval and support of the working people.

Rallied around the Communist Party, the Soviet people have won historic new victories in developing industry, agriculture, science and culture, and in raising the working people's material standard of living. They have brought about enormous transformations which have made it possible for our country to enter into a major new period in its development, the period of the extensive building of a communist society.

A genuine cultural revolution has been effected in the U.S.S.R. In this the Soviet school system has played a decisive role, helping to raise the cultural level of the peoples of our multinational homeland. As a result of a consistent implementation of the Leninist national policy, all the peoples of the Soviet land have schools using their native language; education and culture have been made widely accessible to all; universal 7-year education has been instituted; secondary, technical vocational and higher education have been extensively developed; and science, literature and art are developing at unprecedented rates.

The gulf between physical and mental labor was one of the cardinal vices of the old society. For millions of rank-and-file citizens, culture was for centuries a forbidden fruit. The old society organized its school system in such a way as to make it virtually inaccessible to the broad masses of working people.

Marxist-Leninist teaching, confirmed by the entire practice of the building of communism in the U.S.S.R. and the experience of other socialist countries, has dispersed the bourgeois myth alleging the inevitable and permanent existence, on the one hand, of the grey masses whose lot is submissive and heavy physical labor and, on the other, of a handful of people allegedly called upon by the very nature of things to do the thinking and governing and to develop science, technology, literature and the arts.

In a socialist society, where the basic distinctions between physical and mental labor are gradually being eliminated and the unity of mental and physical labor affirmed, the development of all aspects not only of material production but also of the spiritual activities of the broadest working masses is being tremendously accelerated. Boundless horizons are opening for all-round development of the personality. Under socialism all the achievements of world culture become the property of the people.

As the building of communism gets under way and as the production forces expand and public wealth increases, the working day will become shorter and shorter and the work-

[1] The information in this section was compiled primarily by Dr. Jerry Hough, Department of Government and Russian Research Center, Harvard University. The author is greatly indebted to Dr. Hough for this work.

[2] For the sake of brevity the abbreviation "SSR" in the names of the republics has been omitted in this presentation.

[3] This is another indication of the usual process of shaping school programs for the U.S.S.R. at large. The Russian SFSR (its Ministry of Education and Academy of Pedagogical Sciences) sets the path, which the other republics then follow with minor modifications.

[4] The translation of this preamble portion of the law was taken from *The Current Digest of the Soviet Press,* Vol. XI, No. 4, Feb. 1959, pp. 12–13.

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ing people will have more and more leisure time in which to broaden their horizons and satisfy their spiritual needs.

The accelerated development of mechanization and automation, the rapid introduction in industry of advances in chemistry, the extensive use of electronics, calculating and computing machines, the comprehensive development of electrification and other scientific and technological achievements are radically altering the nature of labor. In essence the labor of workers and collective farmers is coming increasingly to resemble the labor of engineers, technicians, agronomists and other specialists. Workers in socialist production must now know how to handle modern machine tools and the most accurate measuring and control devices and equipment and to understand complicated technical calculations and blueprints. The prospects for the technical and economic development of the Soviet Union are placing ever greater demands on all the working people of our society. A diversified education is becoming one of their vital needs.

It would be a profound error to assert that physical labor will disappear with the automation of production in the communist society. Gigantic technological advances will immeasurably ease the burden of physical labor; many exhausting occupations are disappearing and will continue to disappear, but physical labor will remain. Man's harmonious development is unthinkable without physical labor, the creative and joyful labor which strengthens the body and enhances its vital functions.

V. I. Lenin, the great founder of the Soviet state, taught that young people must combine their studies with work, with the struggle to reorganize industry and agriculture and to raise the cultural and educational level of the people.

The communist transformation of society is linked inseparably with the rearing of the new man, in whom spiritual wealth, moral purity and physical perfection will be harmoniously combined.

The socialist state has organized its school system to serve the people, provide the workers with knowledge and foster the development of all the talents of its people. The Soviet schools are bringing up the growing generation in the spirit of the most progressive ideas, the ideas of communism, and are shaping in youth the materialist world view—the basis for a truly scientific cognition of the world.

A remarkable generation of young people has been reared in the Soviet society and is dedicating all its knowledge and energies, all its capacities and talents to the building of communism. The high moral qualities of Soviet young people were graphically displayed on the labor fronts of socialist construction during the First 5-year Plan, in the Great Patriotic War, in feats of heroism performed in developing the virgin and fallow lands, in the construction of large power stations, mines and blast furnaces, in the building of new industrial centers in the East and North of our country, and in many other labor exploits of recent times.

Soviet higher educational institutions and specialized secondary schools have played an important role in helping to win the Soviet people's great victories. At the present time there are approximately 7,500,000 specialists with a higher or specialized secondary education working in the national economy. The training of large numbers of specialists has been one of the greatest achievements of the Communist Party and Soviet state.

The Soviet Union has moved into a leading place in the world in the development of science and technology and has outdistanced the most advanced capitalist countries in tempo and quality of specialist training. By their selfless labor in industry, construction and transportation, on state and collective farms and in all spheres of the economy and culture, Soviet specialists are successfully solving the task of building communism.

The next 7 years in the development of the Soviet Union will be characterized by a further advance in Soviet culture, an increase in the spiritual wealth of Soviet society, and a rising level of consciousness among the working people, who are the active builders of communism. Under present conditions the problems of the communist upbringing of the working people, especially the growing generation, assume exceptional importance and become a central concern of state and public organizations.

Despite outstanding achievements in the development of the Soviet schools and in the training of specialists for all branches of the national economy and culture, our general and specialized secondary schools and our higher educational institutions lag behind the demands of communist construction and have serious shortcomings. The principal shortcoming is the extent of the gap between schooling and life, the poor preparation which the school graduates receive for practical work. This weakness in the public education system can no longer be tolerated at the present stage in the building of communism.

Public education must be reorganized in such a way that Soviet secondary and technical vocational schools and higher educational institutions play a more active role in all the constructive activity of the Soviet people.

Soviet secondary schools are called on to prepare educated individuals with a good command of the fundamentals of science and, at the same time, capable of systematic physical labor, and to inculcate in youth a desire to be of use to society and to take an active part in producing the values needed by society. The scope of secondary education must be greatly expanded, primarily through the extensive development of a network of schools for young people working in the national economy. The accomplishment of this task is a basic prerequisite for a further rise in the cultural and technical level of the working people, for an increase in labor productivity and for the successful building of communism.

The continued technical progress in all branches of the national economy is intensifying the demand that the majority of workers be skilled. The inadequate technical vocational level of some of the workers is even now holding back production growth in certain instances. Therefore the development of technical vocational training for young people and the improved training of cadres of workers becomes particularly important.

The new tasks of communist construction demand that shortcomings in the organization of higher and specialized secondary education likewise be eliminated.

Soviet higher educational institutions are called on to prepare fully educated persons thoroughly grounded in their respective branches of science and technology. Special efforts must be made to further improve the quality of training given specialists going into industry, agriculture and construction. Modern production, which is based on the latest scientific and technological achievements, requires that people graduating from higher and specialized secondary schools have a high level of theoretical training and good working knowledge of their specialty.

Under the new conditions the provision of higher and specialized secondary training of specialists through correspondence or evening schools becomes particularly important. The correspondence and evening system of higher and specialized secondary education must be organized in such a way that people engaged in socially useful labor will have the opportunity, if they so desire, to obtain a higher or specialized secondary education or improve their qualifications in their free time.

There should be a decisive improvement in the job done by the higher and specialized secondary schools to develop the students' Marxist-Leninist world view, to heighten their communist awareness and participation, to bring up young specialists in the spirit of collectivism and love of labor, awareness of their public duty, in the spirit of socialist internationalism and patriotism and of adherence to the lofty principles of communist morality.

It is the sacred duty of every person who lives in a socialist society and enjoys the benefits thereof to work at a factory or collective farm, industrial enterprise, state farm, repair and technical station, or office, i.e., to perform honest, useful labor for society.

Every person living in a communist society must contribute

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his share of labor to the building and further development of that society.

The progressive development of the productive forces during the building of the communist society, the improvement of socialist social relations and the further development of Soviet democracy create favorable conditions for the successful completion of the new tasks the schools face in the communist upbringing and education of young people.

The Supreme Soviet of the Union of Soviet Socialist Republics *resolves:*

To approve the theses of the C.P.S.U. Central Committee and U.S.S.R. Council of Ministers "On Strengthening Ties Between School and Life and on Further Developing the Country's System of Public Education," which received universal support in a nationwide discussion;

To recognize the necessity of preparing children from their very first years in school for the fact that they must take part in socially useful work when they are older. From the age of 15 or 16 all young people must undertake to perform socially useful labor consonant with their ability, and the entire subsequent education of young people must be linked with productive labor in the national economy.

* * *

This introduction to the Educational Reform Law of the U.S.S.R. is then followed in this and the 15 other laws by the individual articles. In this summary review these individual articles have been taken from the Educational Reform Law for the Russian SFSR and then compared with articles in the U.S.S.R.'s law and the laws for the 14 other republics. The translation of the articles of the RSFSR law and the comparisons made are as follows:

Law on Strengthening Ties Between School and Life and on Further Developing Public Education in the Russian SFSR

Part I.—SECONDARY SCHOOLS

Article 1: RSFSR

To introduce in the RSFSR in all localities universal compulsory 8-year education for all children and youths aged 7 to 15–16.

The fulfillment of universal compulsory 8-year education should command the attention of all state organs, social organizations and all parents as one of the most important state aims upon the attainment of which depends the further development of the cultural level of the Soviet people.

The 8-year school constitutes the incomplete secondary, general education, labor polytechnical school. It should teach pupils the firm foundations of general and polytechnical knowledge. It should inculcate in them a love for work and prepare them for socially useful activity. It should conduct moral, physical and esthetic education.

The work of education and upbringing in the 8-year school should be organized along the lines of combining study of the fundamentals of science [knowledge], polytechnical education and labor training with fostering the wide participation of the students in socially useful labor suitable to their age.

In the process of the work of education and upbringing, the school should acquaint pupils with various forms of labor in our society and aid them in developing their aptitude and foster a conscious choice of future occupation.

The transition of schools from 7-year to 8-year compulsory education shall begin in 1959–60 and shall be completed by 1962–63. In the course of this transition the gradual consolidation of 8-year schools into larger school units is to take place.

In centers with small populations the elementary schools consisting of grades 1–4 are to be continued; pupils entering the 5th grade are to be transferred to the closest (8-year) school.

Article 1: Other republics

U.S.S.R.—The content of Article 1 of the RSFSR law is scattered throughout Articles 1–3 of the U.S.S.R. law. There is, however, no mention of the retention of the elementary 4-year schools upon the completion of the reform.
Ukraine—Identical with RSFSR.[5]
Armenia—Identical with RSFSR.
Azerbaidzhan—No specific date for the completion of the educational reform is given. Otherwise similar to RSFSR.
Belorussia—No specific date for the completion of the educational reform is given. Otherwise similar to RSFSR.
Estonia—Identical with RSFSR.
Georgia—No specific date for the completion of the educational reform is given. Otherwise similar to RSFSR.
Kazakhstan—Identical with RSFSR.
Kirgizia—Identical with RSFSR.
Latvia—There is no mentioning of the retention of elementary schools. Otherwise similar to RSFSR.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Completion of transition to 8-year schools is scheduled by 1961–62. Otherwise similar to RSFSR.
Turkmenia—Identical to RSFSR.
Uzbekistan—Identical to RSFSR.

Article 2: RSFSR

To place the responsibility for achieving universal compulsory 8-year education upon the Councils of Ministers of the autonomous republics, and upon the Executive Committees of the territorial, regional, provincial, city, district, settlement and village Soviets of Deputies of Toilers.

In order to achieve universal compulsory 8-year education the following measures are to be undertaken:

(a) Wherever needed for students residing 3 or more kilometers away from school, boarding facilities *(internaty)*[6] should be organized, and/or measures should be undertaken to organize regular transportation for these pupils to and from school.

(b) The network of schools or classes with an extended [instruction] day should be increased.

(c) The schools should create a monetary [aid] fund for general education, which is to be made up through deductions from the budgetary account in an amount of not less than *1 percent* of the current expenditures for school maintenance, and through the contribution of funds from collective farms, cooperative organizations and trade unions for the purpose of material aid to needy students (free meals, clothing, footwear, textbooks and other aid items).

The regulatory ordinance about the monetary [aid] fund for general education will be ratified by the Council of Ministers of the RSFSR.

Article 2: Other republics

U.S.S.R.—There are no similar items in the U.S.S.R. law, except for the clause in section (b) of the RSFSR law, which appears as Article 5 of the U.S.S.R. law.
Ukraine—Almost identical in language, though with two additional revenue sources of the monetary [aid] fund for general education: the income derived from either (1) the sale of produce from garden plots and school farms

[5] The word "identical" as used in the comparisons here and below, means that the content of an article of a given republic's law is identical to that in the RSFSR's law. Frequently the likeness is verbatim, though on occasion there may be slight differences in arrangement of paragraphs or sentences, and variations in wording. Any significant difference in content is always singled out.

[6] Note these are *not* boarding schools. See discussion of the definition of "boarding school" in the text (Ch. II).

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of rural areas or (2) the sale of products of school workshops in the cities.

Armenia—The "1 percent" deduction from the school maintenance budget is not mentioned. The additional revenue items derived from school agricultural or industrial output for the monetary [aid] fund for general education are included. Transportation aid and/or boarding facility eligibility is given to pupils living more than 2 kilometers from the school.

Azerbaidzhan—Identical to Armenia, but distance from school must be 3 kilometers or more to receive aid.

Belorussia—Identical to Armenia; commuting distance 3 to 4 kilometers.

Estonia—Identical to Armenia.

Georgia—Identical to Armenia.

Kazakhstan—Identical to Armenia.

Kirgizia—Identical to Armenia, with the additional clause that children should be provided with transportation by the respective collective farms, state farms, RTS (repair technical stations), factories or establishments under whose auspices the parents reside. There is also special mention of the education of shepherds' children.

Latvia—Distance is 3 to 4 kilometers to be eligible for transportation or boarding aid. The section about the monetary [aid] fund is absent, and instead it is stated that all youngsters in grades 1–8 are to be supplied with free textbooks starting with the academic year 1962–63.

Lithuania—Identical to Armenia.

Moldavia—Identical to Armenia.

Tadzhikistan—Identical to Armenia. However, only pupils in grades 1–4 are eligible for transportation or boarding aid if they live 3 or more kilometers from school.

Turkmenia—Identical to Ukraine.

Uzbekistan—Identical to Armenia.

Article 3: RSFSR

It is to be decreed that parents or persons who are their legal substitutes [i.e., guardians] who do not see to it that their children attend school will be made legally responsible under the provisions of the administrative law in a manner indicated by the ordinances of the executive committees of the provincial and regional councils of Deputies of Toilers, and in the autonomous republics in the manner indicated in the decrees of the Councils of Ministers of the autonomous republics.

The Central Statistical Administration of the Russian SFSR and its local offices must improve the statistical reporting of children and youths of school age.

Article 3: Other republics

U.S.S.R.—The U.S.S.R. law has no similar provision about the administrative liability of parents and guardians.

Ukraine—Similar to RSFSR, with the provision that the various executive councils are instructed to work out measures for strengthening the responsibility of parents and guardians for school attendance. The wording "legally responsible under the provisions of the administrative law" is not used.

Armenia—Puts the responsibility for school attendance on the executive committees and the parents.

Azerbaidzhan—Parents or other persons hindering 8-year education "will be held responsible in the manner provided for in the code of laws of the Azerbaidzhan SSR." Azerbaidzhan law emphasizes the necessity of insuring 8-year education particularly for Azerbaidzahn *girls* by repeating the general theme of Article 3 in another article at the end of the school reform law for Azerbaidzhan.

Belorussia—Wording on responsibility is identical to Azerbaidzahn. Adds that the role of "collectives of toilers and social organizations" should be strengthened in supervising school affairs. There should be public discussion of infringements of this rule. The Council of Ministers is instructed to issue a decree on the subject.

Estonia—Almost identical to Belorussia.

Georgia—Wording on "responsibility" for school attendance is identical to that in Azerbaidzahn law. There is no added emphasis on the education of native girls.

Kazakhstan—Almost identical to RSFSR. The words about liability under the administrative law are included.

Kirgizia—Similar to Tadzhikistan law (see below). Not administrative, but criminal liability is stipulated.

Latvia—In reference to legal liability under administrative law it is added that persons "deliberately" violating the law about compulsory 8-year education can be deprived of their parental rights or the children sent to orphanages or boarding schools.

Lithuania—Almost identical to Belorussia law.

Moldavia—Wording similar to Azerbaidzhan. Adds that the Council of Ministers is to issue a decree establishing "administrative code of responsibility" of parents or officials hindering the execution of 8-year education.

Tadzhikistan—Persons hindering 8-year education are to be made legally liable and will be tried in court subject to *criminal* procedures. Adds a preface that there must be a struggle with feudalistic tendencies in this respect, particularly in regard to the education of *girls* of the local nationality. All public means of influence, including the press and radio, must be utilized to foster the execution of 8-year compulsory education. Note the provisions for criminal liability.

Turkmenia—Similar to Tadzhikistan, except that the words about criminal liability are replaced by a phrase identical to that used in the Azerbaidzhan law, i.e., persons will be held responsible in the manner provided for in the code of laws of the Turkmenian SSR.

Uzbekistan—Identical to Tadzhikistan.

Article 4: RSFSR

Students who complete the 8-year school receive a certificate of a type uniformly established by the Ministry of Education of the Russian SFSR. Graduates of the 8-year school have the right to apply for entry into vocational-technical schools and secondary general education and secondary specialized educational establishments.

Article 4: Other republics

U.S.S.R.—Article 4 does not appear as such in the U.S.S.R. law, but its contents are covered in articles 4 and 22 of the U.S.S.R. law.

Ukraine—Identical to RSFSR.

Armenia—Identical to RSFSR.

Azerbaidzhan—Identical to RSFSR.

Belorussia—Identical to RSFSR.

Estonia—Identical to RSFSR.

Georgia—Identical to RSFSR.

Kazakhstan—Identical to RSFSR.

Kirgizia—Identical to RSFSR.

Latvia—Identical to RSFSR.

Lithuania—Identical to RSFSR.

Moldavia—Identical to RSFSR.

Tadzhikistan—Article 4 is not present. Its contents are embodied into the law by implication, however.

Turkmenia—Identical to RSFSR.

Uzbekistan—Identical to RSFSR.

Article 5: RSFSR

It is hereby decreed that all youths beginning with age 15–16, upon the completion of the 8-year school, are to be enlisted into socially useful labor suitable to their age and that they shall be provided with a wide opportunity to complete secondary education on the basis of a combination of schooling and productive labor in the educational establishments of the following types:

(a) the evening (or alternating shift) secondary general education school with the term of study in these schools of 3 years. In these schools persons who have graduated from

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the 8-year school and who are working in one of the branches of the national economy will receive secondary education and raise their vocational skill qualifications. For those who did not complete 8-year education there will be retained in schools for working youth all grades beginning with the third, for a number of years to come. If there is insufficient enrollment to organize independent evening (or alternating shift) secondary general education schools for the education of working youth, there may be organized, for the purpose of carrying out such instruction, special separate grades attached to the [regular] secondary general education, labor polytechnical school with production training.

(b) secondary general education labor polytechnical school with production training, in which persons who have completed the 8-year school may receive during the three years a secondary education and vocational training preparing them for a job in one of the branches of the national economy or culture. These schools may be organized separately from the 8-year school or they may be added to the 8-year school.

(c) the secondary specialized educational establishment (technicums and other semiprofessional schools) in which graduates of the 8-year school are to receive general secondary and secondary specialized education.

In addition, further expansion should take place of secondary general education labor polytechnical schools conducting instruction in a number of subjects in foreign languages, and special schools for very gifted children in music, choreography and the expressive arts.

Article 5: Other republics

U.S.S.R.—Partial content of Article 5 of the RSFSR law appears in the U.S.S.R. law under Article 4. Not included are the statements that (1) the evening schools will have all grades from the third up, at least for some years to come; (2) that if there are not enough students for an evening school there should be established separate classes for working youth under the regular schools with production training; (3) that the secondary schools with production training can either be separate or joined to the 8-year school; and (4) that there are to be special schools for foreign language training [i.e., schools conducting instruction in a foreign language] and for the musically and artistically gifted. The U.S.S.R. law still uses the phrase "schools for working and rural youth," while the RSFSR law refers to schools for working or "employed" youth only.

Ukraine—Almost identical in wording with RSFSR. Uses the term "secondary general education schools for working and rural youth" (as in U.S.S.R. law).

Armenia—Identical to RSFSR except that there is no mention of schools conducting instruction in a foreign language.

Azerbaidzhan—Identical with Armenia.

Belorussia—Identical with Ukraine, except that it emphasizes the creation of some foreign language schools by including a separate article to that effect.

Estonia—Identical with Ukraine.

Georgia—Identical with Ukraine.

Kazakhstan—Identical with Ukraine.

Kirgizia—Identical with Ukraine.

Latvia—Special clause that students studying in these schools should have a reduced work day or work week. Nothing about special schools for foreign language or the artistically gifted. Adds that secondary general education labor polytechnical schools with production training can be *seasonal* if necessary.

Lithuania—Uses the words "secondary general education schools for working and rural youth." Nothing about foreign language schools nor about individual classes attached to regular schools if too few students for a whole school. The rural school year should be constructed on a seasonal basis.

Moldavia—Uses the phrase "schools for working and rural youth." Adds that the rural school year should be planned, taking into account the *seasonality* of agricultural work.

Tadzhikistan—Identical with Ukraine.

Turkmenia—Identical with Ukraine.

Uzbekistan—Identical with Ukraine.

NOTE.—In most republics the terminology "schools for working and rural youth" has been retained. The Ukraine law differs from the RSFSR law only in respect to this wording; therefore the Estonia, Georgia, Kazakhstan, Kirgiz, Tadzhikistan, Turkmenia, and Uzbekistan laws are identical to the Ukraine-RSFSR version.

Article 6: RSFSR

In order to enhance the role of society in educating youth, to help the family in the upbringing of children, to improve the combination of education with socially useful labor and to foster the many-sided education of the new generation, the network of boarding schools should be expanded. Boarding schools are to be organized along the lines of the 8-year school or secondary general education labor polytechnical schools with production training.

Article 6: Other republics

U.S.S.R.—Similar in wording with the RSFSR law, although the U.S.S.R. law mentions schools or classes with an extended instruction day in this article, while the RSFSR law mentions this in Article 2.

Ukraine—Identical with RSFSR.

Armenia—Identical with RSFSR.

Azerbaidzhan—Identical with RSFSR.

Belorussia—Identical with RSFSR.

Estonia—Identical with RSFSR.

Georgia—Identical with RSFSR.

Kazakhstan—Adds in a separate clause that girls of the local nationality are to be given preference in entering boarding schools by the acceptance committee.

Kirgizia—Similar to Kazakhstan.

Latvia—Adds that rural schools with boarding facilities and some orphanages are to be reorganized into boarding schools.

Lithuania—Identical with RSFSR.

Moldavia—Identical with RSFSR.

Tadzhikistan—Adds that a network of separate boarding facilities for girls is to be set up in conjunction with secondary general education labor polytechnical schools with production training and expanded. Also in some areas there will be boarding schools for girls exclusively.

Turkmenia—Similar to Kazakhstan.

Uzbekistan—Identical with RSFSR.

Article 7: RSFSR

To reorganize the existing 10-year schools, namely their upper grades, into various types of city and rural general education schools. Wherever necessary, these schools may establish extension-correspondence (*zaochnye*) divisions.

Organization of various types of complete secondary schools is to begin in 1959–60 and be completed in the next 5 years. In determining the new network of 8-year and various types of complete secondary schools, there is to be no reduction in the availability of school facilities to the resident population.

Students in the present grades 8–10 are to have the opportunity of completing secondary education in accordance with the current curriculum and programs of study; however, their labor training is to be intensified.

The Council of Ministers of the RSFSR, the councils of ministers of the autonomous republics, the executive committees of provincial and regional councils of Deputies of Toilers must work out plans for transition to the new system of education in accordance with specific local conditions of economic and cultural development of the autonomous republics, provinces and regions, taking into consideration the need for the further expansion of secondary education particularly through the expanded system of evening (or alternating shift) secondary general education schools, increases in

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the contingents of girls of local nationality in the upper grades of schools located in autonomous republics, autonomous national regions and national districts. These measures should provide higher educational establishments with a sufficient number of graduates of secondary schools.

Article 7: Other republics

U.S.S.R.—Foresees the completion of the reform in 3 to 5 years. The U.S.S.R. law states nothing about extension-correspondence divisions in secondary general education schools.

Ukraine—Foresees the completion of the reform in 4 to 5 years. Similar to U.S.S.R. law in ignoring mention of extension-correspondence divisions. Mentions nothing about local conditions or fostering secondary schooling of girls of the local nationality.

Armenia—Completion of the reform in the 1963–64 school year. Nothing about extension-correspondence divisions nor about local conditions or girls of the local nationality.

Azerbaidzhan—Completion of reform in 3 to 5 years. In stating that the higher educational establishments must be guaranteed enough graduates, it continues that a certain number of the present secondary schools will be retained during the transition period. Nothing about local conditions.

Belorussia—Besides extension-correspondence divisions, the student can also receive a secondary education through *eksternat*.[7] The reform is to be completed in 4 years. Nothing about local conditions or girls of the local nationality.

Estonia—Like Belorussia, the word *eksternat* is also used. Nothing about local conditions or girls of the local nationality. Nothing about assuring higher educational establishments enough graduates.

Georgia—Foresees the completion of the reform in 3 to 5 years. Nothing about extension-correspondence divisions, about guaranteeing the higher educational establishments enough graduates, or about local conditions and girls of the local nationality. Adds to the injunction against worsening the school situation one against lowering the quality of secondary education.

Kazakhstan—Complete the reform in the school year 1963–64. Nothing about local conditions or girls of the local nationality (except with respect to boarding schools). Nothing about assuring higher educational establishments enough graduates nor about extension-correspondence divisions.

Kirgizia—Similar to Kazakhstan.

Latvia—Complete the reform by 1964. States that the number of students in all types of secondary schools should increase so that the level of secondary education will not be lowered. Nothing about assuring higher educational establishments enough graduates or about local conditions and girls of the local nationality.

Lithuania—Complete the reform in 5 years. Nothing about assuring higher educational establishments enough graduates or about local conditions or girls of the local nationality. Nothing about extension-correspondence divisions.

Moldavia—Nothing about guaranteeing enough students to higher educational establishments or about local conditions or girls of the local nationality. Complete the reform in 3 to 5 years. Nothing about extension-correspondence divisions.

Tadzhikistan—Complete the reform in 3 to 5 years. Adds that a certain number of secondary schools will be kept open during the transition period (3–5 years) to insure the higher educational establishments enough students. Nothing about guaranteeing present 8th to 10th grade students a continuation of their studies. Nothing about extension-correspondence divisions.

Turkmenia—Finish the reform by 1962–63 school year. Emphasizes the need of widening secondary education, particularly through the system of night school. Nothing about local conditions.

Uzbekistan—Finish the reform in 3 to 5 years. Nothing about extension-correspondence divisions.

Article 8: RSFSR

The councils of ministers of the autonomous republics, the executive committee of the provincial or regional councils of Deputies of Toilers, regional councils of the national economy (*sovnarkhozy*) of the economic administrative regions, heads of enterprises, construction projects, state farms, repair stations [tractors and agricultural machinery] and offices must urge the youth employed by them to complete their secondary education. Plans must be established for the schooling of these youth who are to complete their education. Working youths who study successfully and who fulfill their production norms must be aided in advancement on the job. Aid should be given to school teachers for the improvement of their work in education and upbringing of youth and particularly in raising the vocational skill qualification of the students. During the school year youths should not be called upon to perform jobs on a full-time basis so as to interrupt study entirely. Places of employment should grant leaves to [partly-employed] youths coinciding with those of the school recess and employed youths should be given leaves with pay for taking the required examinations.

Collective farms are advised to create the necessary conditions for combining school education with productive employment.

Article 8: Other republics

U.S.S.R.—The provisions of this article are entirely absent in the U.S.S.R. law.

Ukraine—Identical to RSFSR.

Armenia—Nothing about promoting young workers who are studying and fulfilling the plan nor about granting furloughs at the same time as school vacations.

Azerbaidzhan—The provisions of this article are entirely absent in the Azerbaidzhan law.

Belorussia—Identical to RSFSR.

Estonia—Almost identical to RSFSR.

Georgia—Leaves out the phrase, "during the school year youths should not be called upon to perform jobs on a full-time basis so as to interrupt study entirely."

Kazakhstan—Identical to Armenia.

Kirgizia—Omits the phrase about the promotion of youths.

Latvia—Article 8 omitted entirely in Latvia law.

Lithuania—Almost identical to RSFSR.

Moldavia—Almost identical to RSFSR.

Tadzhikistan—Identical to Georgia.

Turkmenia—Almost identical to RSFSR.

Uzbekistan—Almost identical to RSFSR.

Article 9: RSFSR

Production training and socially useful labor of students of secondary schools with production training must be organized in study shops and production shops of nearby industrial enterprises, in study work brigades of the collective farm and state farms, and in special training-production shops attached to individual schools or groups of schools.

The combination of theory and practice in production training and the sequential periodization of study and work must be specified in the instruction programs in accordance with the vocational skill specialization of pupils and in relation to the prevailing local conditions.

The determination of the roster of vocational skills in which the training of pupils is to take place in the secondary general education labor polytechnical schools with production training must be made by the councils of ministers of the autonomous republics, executive councils of provincial,

[7] *Eksternat*—the form of education in which the student does not attend school and does not complete specific assignments, but only registers for the final examination. Satisfactory passing of the final examinations results in a grade promotion or in a graduation certificate.

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regional, district and city councils of Deputies of Toilers on the basis of the availability of productive facilities and demand requirements for skilled occupations by the national economy. In determining vocational skills the peculiarities of work in urban and rural areas and those of females should be taken into consideration.

The councils of ministers of autonomous republics, executive committees of provincial and regional councils of Deputies of Toilers, regional councils of the national economy in the administrative economic region, ministries and departments of the RSFSR are to:

(a) secure work places for the production training of youths in industrial enterprises, construction projects, state farms, repair stations, and set up study shops at the industrial enterprises as well as special study-production shops attached to individual schools or groups of schools. All these shops are to operate in accordance with the rules of labor protection and safety;

(b) secure the assignment of engineering-technical, agronomy and skilled labor personnel for carrying out the production training of students.

Article 9: Other republics

U.S.S.R.—Present only in rudimentary form. Similar ideas are expressed but not elaborated upon, mainly in Article 4 of the U.S.S.R. law.
Ukraine—Identical to RSFSR.
Armenia—Present only in rudimentary form.
Azerbaidzhan—Adds that after the students receive a given skill grade rating they are to be paid for production at the general norm rate.
Belorussia—Has nothing about assigning personnel for production teaching.
Estonia—Almost identical to RSFSR.
Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—In essence the same as RSFSR.
Latvia—Adds that the students are to be paid according to existing norms. Also adds that there must be established at industrial enterprises a quota system for accepting youth for employment. Furthermore, the personnel assigned to teach are to be paid by the *respective* enterprises, state farms, etc.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Almost identical to Latvia.
Turkmenia—Identical to RSFSR.
Uzbekistan—Identical to RSFSR.

Article 10: RSFSR

Collective farms are advised to effect the organization of production training of students in the student work brigades of the collective farms, study-experimental facilities and collective farm brigades with the payment for their work with labor-day credits. Students should be supplied with essential tools and machinery. In order to conduct the production training of students, the needed agronomy and technical personnel should be assigned to this task.

Article 10: Other republics

U.S.S.R.—Present only in rudimentary form.
Ukraine—Identical to RSFSR.
Armenia—Not present at all in the Armenia law.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Nothing about labor day credits for pupils working on collective farms.
Estonia—Identical to RSFSR.
Georgia—Almost identical to RSFSR.
Kazakhstan—Not present in the Kazakhstan law. (The first section is present in rudimentary form in another article.)
Kirgizia—Almost identical to RSFSR.
Latvia—Almost identical to RSFSR.
Lithuania—Almost identical to RSFSR.
Moldavia—Almost identical to RSFSR.
Tadzhikistan—The students are to be paid, but the words "labor days" are not used. Payment to instructors is through the organs of education, rather than by the organizations from which they are assigned.
Turkmenia—Nothing about paying the students.
Uzbekistan—Almost identical to RSFSR.

Article 11: RSFSR

Special schools for children and youths with physical handicaps and the mentally retarded should be established in correspondence with the newly established types of schools taking into account the special needs of students to be enrolled in these schools.

Article 11: Other republics

U.S.S.R.—Not present in the U.S.S.R. law.
Ukraine—Adds that all of these students should be in boarding schools.
Armenia—Identical to RSFSR.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Identical to RSFSR.
Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—Identical to RSFSR.
Latvia—Identical to RSFSR.
Lithuania—Almost identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Almost identical to RSFSR.
Turkmenia—Almost identical to RSFSR.
Uzbekistan—Not present in Uzbekistan law.

Article 12: RSFSR

It is established that 8-year schools, evening (alternating shift) secondary general education schools and secondary general education labor polytechnical schools with production training shall operate in accordance with the curriculum and study programs and textbooks approved by the Ministry of Education of the RSFSR.

The Council of Ministers of the RSFSR is to ratify the regulatory statutes concerning the operation of these schools, as well as the dates for beginning and end of the academic year and periods for school recesses.

Article 12: Other republics

U.S.S.R.—Not present.
Ukraine—First clause not present.
Armenia—First clause not present.
Azerbaidzhan—First clause not present.
Belorussia—Identical to RSFSR.
Estonia—Identical to RSFSR.
Georgia—First clause not present.
Kazakhstan—First clause not present. Dates of school year are given.
Kirgizia—First clause not present.
Latvia—Identical to RSFSR. Dates of school year are given.
Lithuania—Identical to RSFSR.
Moldavia—First clause not present.
Tadzhikistan—First clause not present.
Turkmenia—Identical to RSFSR.
Uzbekistan—First clause not present.

NOTE.—In the law of each republic the respective Council of Ministers and Ministry of Education are mentioned.

Article 13: RSFSR

The respective organs of public education and public health are to establish strict supervision over the alternating periods of work and rest of the pupils in 8-year and secondary general education labor polytechnical schools with production training and control over the enterprises, construction proj-

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ects, state farms, repair stations, special study-production shops attached to individual schools or groups of schools and work on the collective farms so that the rules of labor protection and safety are maintained. The necessary measures for the improvement of the health of the pupils are to be undertaken.

Article 13: Other republics

U.S.S.R.—Not present.
Ukraine—Identical to RSFSR.
Armenia—Includes an injunction against overloading the students with school, production and public work and adds that social organizations also should participate in realizing this clause.
Azerbaidzhan—Identical with Armenia.
Belorussia—Similar to Armenia.
Estonia—Almost identical to Armenia.
Georgia—Almost identical to Armenia.
Kazakhstan—Almost identical to Armenia.
Kirgizia—Almost identical to Armenia.
Latvia—Similar to Armenia, except nothing about social organizations.
Lithuania—Similar to Armenia.
Moldavia—Almost identical to Armenia.
Tadzhikistan—Almost identical to Armenia.
Turkmenia—Adds that the social organizations should be attracted to this work.
Uzbekistan—Similar to Armenia, but adds that the trade unions are also responsible rather than social organizations.

Article 14: RSFSR

In order to further improve the teaching of the fundamentals of science [knowledge] and productive training, all possible measures should be undertaken to foster independent work and initiative on the part of the pupils. Visual aids to education, movies, television and other modern technical teaching aid devices are to be used more extensively. Schools should foster the technical inventiveness of pupils, the work of pupils in making new equipment and models, the construction of technical devices and agricultural experimentation.

Schools and institutions in charge of extra-school activities must foster the formation and further the development of different abilities and many-sided interests of the pupils, for such development is an essential condition for the harmonious development of personality and is indispensable for the conscious choice of occupation and better preparation of youths to live in a communist society.

Article 14: Other republics

U.S.S.R.—Not present.
Ukraine—Identical to RSFSR.
Armenia—Not present.
Azerbaidzhan—Not present.
Belorussia—Almost identical to RSFSR.
Estonia—Almost identical to RSFSR.
Georgia—Almost identical to RSFSR.
Kazakhstan—Not present.
Kirgizia—Not present.
Latvia—Identical to RSFSR in rudimentary form.
Lithuania—Identical to RSFSR.
Moldavia—Almost identical to RSFSR.
Tadzhikistan—Almost identical to RSFSR.
Turkmenia—Almost identical to RSFSR.
Uzbekistan—Almost identical to RSFSR.

Article 15: RSFSR

It is decreed that instruction be conducted in the native language. Parents have the right to choose the school conducting instruction in a given language which their children are to attend.

In schools which conduct instruction in the language of the autonomous republic, autonomous national region, or national district, study of the Russian language is conducted in accordance with the wishes of the pupils. Similarly, in Russian-language schools pupils who desire may study the national language of the autonomous republic, autonomous national region or national district.

Article 15: Other republics

U.S.S.R.—Not present.
Ukraine—Only the study of Ukrainian in Russian schools is voluntary. The Russian language is required in all schools. Any other language of the peoples of the U.S.S.R. can be taught if enough parents request it.
Armenia—Similar to RSFSR, but adds that one foreign language should be studied, if local conditions permit.
Azerbaidzhan—Does not state what is to be the case for learning the second language.
Belorussia—Identical with RSFSR.
Estonia—Similar to RSFSR, but makes it quite clear that Russian is to be studied everywhere. Adds that foreign language study should be improved.
Georgia—Similar to RSFSR, but adds that foreign language will be taught in schools with the proper conditions. Any other language of the peoples of the U.S.S.R. can be taught if enough parents request it.
Kazakhstan—Identical to Georgia.
Kirgizia—Similar to Georgia, adding that the first requirement for letting a school teach foreign languages is qualified teachers. Language of instruction is not limited to Kirgiz and Russian.
Latvia—Not present.
Lithuania—Similar to Georgia. Adds that foreign language teaching is to be improved.
Moldavia—Similar to Georgia. Adds that foreign language teaching should be improved, but that the Ministry of Education is given the right to exclude foreign language from the list of obligatory subjects in any school where there aren't the proper conditions.
Tadzhikistan—Similar to Georgia. Stresses the importance of Russian.
Turkmenia—Similar to Georgia. Other languages than Russian or Turkmen are possible.
Uzbekistan—Similar to Georgia.

Article 16: RSFSR

Serious improvements are deemed necessary in the organization of upbringing [character training] work in the schools, so that the schools will instill in the students a love for learning and labor and a respect for working people and will mold the communist world view in students and bring them up in a spirt of utter devotion to the homeland and the people in the spirit of proletarian internationalism.

The work of the teachers, extra-curricular organizations, parents and social organizations must be further improved in training pupils in the habits of cultured behavior at school, in the family and on the streets. In order to achieve this, educational propaganda work should be strengthened among the broad masses of the population, and the responsibility of parents and all adults to society for the upbringing of children should be increased.

Article 16: Other republics

U.S.S.R.—Similar clause is present in Article 6 of the U.S.S.R. law.
Ukraine—Identical to RSFSR.
Armenia—Almost identical to RSFSR.
Azerbaidzhan—Almost identical to RSFSR .
Belorussia—Almost identical to RSFSR.
Estonia—Almost identical to RSFSR.
Georgia—Almost identical to RSFSR. Slight difference in wording—"spirit of proletarian internationalism and patriotism."

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Kazakhstan—Almost identical to RSFSR.
Kirgizia—Almost identical to RSFSR.
Latvia—Almost identical to RSFSR.
Lithuania—Similar to RSFSR, but adds that *atheistic* propaganda is to be given particular attention.
Moldavia—Identical to RSFSR.
Tadzhikistan—Similar to Lithuania, but adds further the necessity of overcoming and combatting "the survivals of feudal and local-princeling kind of life."
Turkmenia—Almost identical to RSFSR.
Uzbekistan—Adds the phrase "in the spirit of Soviet patriotism."

Article 17: RSFSR

Persons graduating from evening (alternating shift) secondary general education schools and secondary general education labor polytechnical schools with production training and having received the essential preparation for entry into higher educational establishments are issued diploma certificates (*attestat*) of completed secondary education. In addition, persons graduating from secondary general education labor polytechnical schools with production training receive certificates about their vocational skill qualification in the labor specialty in which they were trained.

Article 17: Other republics

U.S.S.R.—Not present.
Ukraine—Identical to RSFSR.
Armenia—Identical to RSFSR.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Identical to RSFSR.
Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—Identical to RSFSR.
Latvia—Identical to RSFSR.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Not present.
Turkmenia—Identical to RSFSR.
Uzbekistan—Identical to RSFSR.

Article 18: RSFSR

The Council of Ministers of the RSFSR shall undertake and decree measures to strengthen the material base of the schools, to expand construction of school buildings of all types, boarding facilities, and shops so as to abolish in the near future multishift instruction, to increase the production of visual aids, equipment for labor education and school furniture.

Collective farms are advised to take an important part in the construction of school buildings, study-production workshops and quarters for boarding facilities attached to schools.

Article 18: Other republics

U.S.S.R.—Similar to RSFSR, except for omission of the clause about the role of collective farms. This article corresponds to Article 10 of the U.S.S.R. law.
Ukraine—Identical to RSFSR.
Armenia—Identical to RSFSR.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Identical to RSFSR.
Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—Identical to RSFSR.
Latvia—Identical to RSFSR.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Identical to RSFSR.
Turkmenia—Identical to RSFSR.
Uzbekistan—Identical to RSFSR.

Article 19: RSFSR

Taking into consideration the new tasks facing the Soviet schools, the Council of Ministers of the RSFSR is to work out and undertake measures to provide for the retraining of teachers, to improve their professional qualifications and to raise their ideological preparation. Schools are to be supplied with qualified teachers in polytechnical subjects and are to be staffed with teachers with the required educational preparation in accordance with the new tasks of the general education school. Measures should be undertaken to further improve the working and living conditions of teachers.

Article 19: Other republics

U.S.S.R.—Identical, appears as Article 11 of the U.S.S.R. law.
Ukraine—Emphasizes the need to give teachers of polytechnical disciplines the proper training for this. This retraining should be done in special faculties of pedagogical institutes and in technical and agricultural higher educational establishments.
Armenia—Identical to RSFSR.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Identical to RSFSR.
Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—Identical to RSFSR.
Latvia—Identical to RSFSR.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Identical to RSFSR.
Turkmenia—Identical to RSFSR.
Uzbekistan—Identical to RSFSR.

Article 20: RSFSR

In conjunction with the reorganization of the schools, one of the important tasks of the Academy of Pedagogical Sciences of the RSFSR and pedagogical institutes is to be research into the scientific foundations of the content of education and the upbringing of pupils in school, improvement in the methods of teaching and communist upbringing of youth. More attention should be paid to the theory of Soviet pedagogy, problems of polytechnical education, vocational skill training and secondary specialized education, as well as to a wider generalization and interchange of positive experience.

Article 20: Other republics

U.S.S.R.—Not present.
Ukraine—Identical to RSFSR.
Armenia—Not present.
Azerbaidzhan—Not present.
Belorussia—Not present.
Estonia—Identical to RSFSR.
Georgia—Identical to RSFSR.
Kazakhstan—Not present.
Kirgizia—Identical to RSFSR.
Latvia—Identical to RSFSR.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Identical to RSFSR.
Turkmenia—Not present.
Uzbekistan—Identical to RSFSR.

NOTE.—Some of the republics make reference to their respective Research Institutes on Schools, which are local counterparts of the Academy of Pedagogical Sciences of the RSFSR.

Part II.—VOCATIONAL-TECHNICAL SKILL EDUCATION

Article 21: RSFSR

The basic task of vocational-technical skill education is the planned and organized training of cultured and tech-

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nically well trained skilled workers and agricultural employees for all branches of the national economy, the communist upbringing of students, their ideological tempering and the inculcation in them of the communist attitude toward work.

For the vocational-technical skill education of youths who will go into production employment upon the completion of the 8-year school, there are to be organized in the autonomous republics, provinces and regions of the RSFSR day and evening urban and rural agricultural vocational-technical schools.

The existing factory-plant training schools, trade schools, railway schools, mining, construction and technical schools, schools of the mechanization of agriculture of the State Labor Reserve Administration, vocational schools, apprenticeship schools and all other types of vocational schools are to be reorganized into day and evening urban vocational-technical schools with one to three years of training, and rural vocational-technical schools with one to two years of training. The length of training will depend upon the complexity of the skill for which the students are to be trained.

The reorganization of existing vocational training establishments into urban and rural vocational-technical schools will begin in 1959 and be completed in 1963, taking into consideration local conditions in individual economic administrative regions.

Priority in the development of the network of vocational-technical schools will be given in the eastern and northern regions of the republic.

Article 21: Other republics

U.S.S.R.—Similar in content to RSFSR, though it appears in Articles 12–14 of the U.S.S.R. law. Reform to be completed in 3 to 5 years. Nothing about eastern regions.

Ukraine—Similar to RSFSR. Reform to be completed by 1964. Nothing about eastern regions.

Armenia—Similar to RSFSR. Reform to be completed in 1963–64 school year. Adds that girls should be more widely attracted into the vocational-technical schools in industrial and agricultural specialties and also trade and services (catering, cleaning, laundry, etc.).

Azerbaidzhan—Reform to be completed in 3 to 5 years. The following schools are indicated: For the vocational-technical skill education of youths who will enter productive employment upon completion of the 8-year school, there will be organized in the Azerbaidzhan SSR:

(a) urban and rural vocational-technical schools;

(b) special urban and rural vocational-technical schools for pupils beyond the regular school age, the training in which will last 2 to 4 years and which will offer, along with vocational skill training, improvement in the general educational level of students.

(c) special vocational-technical boarding schools for orphans and former wards of children's homes (orphanages) which will offer, in addition to vocational skill training, complete secondary education.

Belorussia—Similar to RSFSR. Reform to be completed in 4 years. Sentence on girls identical to Armenia.

Estonia—Similar to RSFSR. Stresses that girls are to be attracted not only into specialties in trade and services but also into skilled occupations in industrial production and particular attention should be devoted to this.

Georgia—Similar to RSFSR. Reform to be completed in 3 to 5 years.

Kazakhstan—Similar to RSFSR. Adds that girls should be attracted more into vocational-technical schools, but stresses more the preparation of youth of the local nationality for heavy industry and agriculture. Reform to be completed in 3 to 5 years.

Kirgizia—Similar to RSFSR. Reform to be completed in 3 to 5 years. Equal stress on girls and boys of the *local* nationalities being attracted.

Latvia—Similar to Azerbaidzhan. Reform to be completed in 2 to 5 years. Training in regular vocational-technical schools under (a) in Azerbaidzhan law is to last 1 to 3 years, but in particularly difficult occupations in art fields the training is to last 4 years. Sections (b) and (c) of Article 21 of the Azerbaidzhan law are repeated verbatim in the Latvia law. Stresses the great need for qualified personnel and calls for an increase in the network of labor reserve.

Lithuania—Similar to RSFSR. Reform to be completed in 3 to 5 years.

Moldavia—Similar to RSFSR. Reform to be completed in 3 to 5 years.

Tadzhikistan—Similar to RSFSR. Reform to be completed in 3 years.

Turkmenia—Similar to Armenia, although abbreviated. Reform to be completed in 4 years.

Uzbekistan—Similar to RSFSR. Reform to be completed in 3 to 5 years.

Article 22: RSFSR

Vocational-technical schools are to specialize in a given branch of industry and conduct the work of education and upbringing of students on the basis of active participation of youth in productive labor in close tie with enterprises, construction projects, state farms and collective farms, seeing that students are trained in modern industrial techniques and progressive methods of labor.

Urban vocational-technical schools are to train skilled workers for industrial enterprises located in a given region and wherever necessary for enterprises located in *other* economic regions.

Rural vocational-technical schools are to train mechanics, construction and other vocational-trade skill workers and to operate under the auspices of technical-repair [tractor and agricultural machinery] stations, state farms, collective farms and other agricultural enterprises. Upon the completion of training graduates are to be assigned to work in technical-repair stations, state farms, collective farms and other agricultural enterprises of those districts from which they were sent for training.

Whenever needed, rural vocational-technical schools may train agricultural workers for other regions of the country.

Article 22: Other republics

U.S.S.R.—Not present, except for first paragraph.
Ukraine—Identical with U.S.S.R.
Armenia—Identical with U.S.S.R.
Azerbaidzhan—Identical with U.S.S.R.
Belorussia—Identical with U.S.S.R.
Estonia—Identical with U.S.S.R.
Georgia—Identical with U.S.S.R.
Kazakhstan—Identical with U.S.S.R.
Kirgizia—Identical with U.S.S.R.
Latvia—Identical with U.S.S.R.
Lithuania—Identical with U.S.S.R.
Moldavia—Identical with U.S.S.R.
Tadzhikistan—Identical with U.S.S.R.
Turkmenia—Identical with U.S.S.R.
Uzbekistan—Identical with U.S.S.R.

Article 23: RSFSR

Ministries and departments of the RSFSR, councils of ministers of the autonomous republics, executive committees of provincial and regional councils of Deputies of Toilers, regional economic councils of the economic administrative regions, enterprises, state farms, offices and organizations must provide urban and rural vocational-technical schools with modern equipment, materials and tools, as well as give procurement orders to special study-production work shops [operated by schools] and provide students with work places for practical experience assignments. These bodies are also to create all the necessary conditions for the successful process of training and mastery by youth of new techniques, advanced technology and high productivity methods of labor.

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Article 23: Other republics

U.S.S.R.—Similar to RSFSR. Adds in a separate clause that there must be a large increase in the preparation of foremen and teachers. Technicums and higher educational establishments must prepare them. Special textbooks also must be improved and the use of radio and TV increased.
Ukraine—Similar to U.S.S.R.
Armenia—Similar to U.S.S.R.
Azerbaidzhan—Similar to U.S.S.R. stressing the increase of textbooks and aids in the native language.
Belorussia—Similar to U.S.S.R.
Estonia—Similar to Azerbaidzhan.
Georgia—Similar to Azerbaidzhan.
Kazakhstan—Adds that the network of educational institutions preparing foremen for industrial training must be widened.
Kirgizia—Similar to Azerbaidzhan.
Latvia—Similar to RSFSR.
Lithuania—Similar to Azerbaidzhan.
Moldavia—Similar to Azerbaidzhan.
Tadzhikistan—Similar to U.S.S.R.
Turkmenia—Similar to Azerbaidzhan.
Uzbekistan—Similar to Azerbaidzhan.

Article 24: RSFSR

In order that the vocational-technical schools can gradually become in part self-supporting the Council of Ministers of the RSFSR is to work out and implement gradually a set of measures expanding and increasing the income of these schools from production activity of study-production shops and study [agricultural] farms. This is to be achieved through the placing of production orders with schools and the allocation to rural vocational schools the necessary land plots on which they can set up their study farms.

Due to the increased material well-being of the working people and in order to stimulate the material incentive of the student in mastering vocational skills, the students are to receive apprenticeship wage payments instead of free uniforms and board.[8] Full state support shall be continued to orphans, former wards of children's homes and children from large families.

Collective farms are advised to resolve the problem of allocating funds for the training of collective farm youths in vocational-technical schools.

Article 24: Other republics

U.S.S.R.—Identical to RSFSR, but it is Article 15 of the U.S.S.R. law. The collective farm financing of pupils in vocational-technical schools is not mentioned.
Ukraine—Identical to RSFSR.
Armenia—Identical to RSFSR.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Identical to RSFSR.
Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—Identical to RSFSR.
Latvia—Identical to RSFSR.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Identical to RSFSR.
Turkmenia—Similar to RSFSR. Included among those getting *free* room and board are Turkmen girls.
Uzbekistan—Identical to RSFSR.

Article 25: RSFSR

The Council of Ministers of the RSFSR shall draw up long-range and annual plans for the vocational training and job placement of youths completing 8-year general education schools, vocational-technical schools and secondary schools with production training, taking into consideration the establishment in production enterprises of a reserved quota [*bron'*] of jobs for youths and enforcing strict supervision over the observance of the rules of labor protection and safety.

Article 25: Other republics

U.S.S.R.—Identical to RSFSR.
Ukraine—Identical to RSFSR.
Armenia—Identical to RSFSR.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Adds that leaders of enterprises and institutions are responsible for utilizing young workers in accordance with their qualifications and securing for them the necessary cultural and living conditions.
Georgia—Identical to RSFSR.
Kazakhstan—Identical to Estonia.
Kirgizia—Almost identical to Estonia.
Latvia—Identical to RSFSR.
Lithuania—Almost identical to Estonia.
Moldavia—Identical to RSFSR.
Tadzhikistan—Identical to RSFSR.
Turkmenia—Identical to RSFSR.
Uzbekistan—Identical to RSFSR.

Article 26: RSFSR

The Council of Ministers of the RSFSR shall work out measures to bring about fundamental improvements in the training of workers through individual-brigade training and course studies and raising of the skill qualifications of workers engaged in production.

Article 26: Other republics

U.S.S.R.—Identical to RSFSR.
Ukraine—Identical to RSFSR.
Armenia—Identical to RSFSR.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Identical to RSFSR.
Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—Identical to RSFSR.
Latvia—Identical to RSFSR.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Identical to RSFSR.
Turkmenia—Identical to RSFSR.
Uzbekistan—Identical to RSFSR.

Part III.—SECONDARY SPECIALIZED [SEMIPROFESSIONAL] EDUCATION

Article 27: RSFSR

The basic task of secondary specialized [semiprofessional] educational establishments is to prepare for industry and agriculture, as well as institutions of culture, education and health, qualified specialists with secondary specialized training.

The training of specialists with secondary specialized education is conducted on the basis of the 8-year school and in some specialties on the basis of completed secondary education.

Article 27: Other republics

U.S.S.R.—Similar to RSFSR. In the U.S.S.R. law the passages appear in Article 21 and 22.
Ukraine—Identical to RSFSR.
Armenia—Identical to RSFSR.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Identical to RSFSR.

[8] As was the case in schools in the Labor Reserve System in the past.

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Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—Identical to RSFSR.
Latvia—Identical to RSFSR.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Identical to RSFSR.
Turkmenia—Identical to RSFSR.
Uzbekistan—Identical to RSFSR.

Article 28: RSFSR

It is hereby decreed that the instruction in the secondary specialized educational establishments must assure the students a secondary-school level education as well as the essential theoretical and practical training in the respective specialty, and in technical and agricultural secondary specialized educational establishments students must in addition receive a qualification rating for the job of skilled worker.

Article 28: Other republics

U.S.S.R.—Identical to RSFSR (Article 23 of the U.S.S.R. law).
Ukraine—Identical to RSFSR.
Armenia—Identical to RSFSR.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Identical to RSFSR.
Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—Identical to RSFSR.
Latvia—Identical to RSFSR.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Identical to RSFSR.
Turkmenia—Identical to RSFSR.
Uzbekistan—Identical to RSFSR.

Article 29: RSFSR

It is deemed desirable that the following forms of education and organization of the educational process be adopted for the training of specialists with intermediate [semiprofessional] qualifications depending upon the specialization and the conditions of subsequent employment in industrial enterprises, construction projects, offices and organizations:

(a) without separation from active employment through evening and extension-correspondence training, which is to be offered primarily to persons who are already employed in occupations related to the training specialty which they choose to study;

(b) with separation from active employment for a study period of various durations;

(c) with separation from active employment through a combination of theoretical study in educational establishments with practical training in the organizations and institutions of various branches of the national economy, culture and public health.

Article 29: Other republics

U.S.S.R.—This article does not appear in the U.S.S.R. law in such an extended version. Its ideas are summarized however, in the first sentence, saying that secondary specialized education can be either with or without separation from active employment.
Ukraine—Identical to RSFSR.
Armenia—Identical to RSFSR.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Identical to RSFSR.
Georgia—In clause (a) the preferential acceptance criterion is omitted.
Kazakhstan—Identical to RSFSR.
Kirgizia—Identical to RSFSR.
Latvia—Identical to RSFSR.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Identical to RSFSR.
Turkmenia—Identical to RSFSR.
Uzbekistan—Identical to RSFSR.

Article 30: RSFSR

The reorganization of secondary specialized education shall be completed in three to five years beginning with the academic year 1959–60 and taking into consideration national and local conditions in order that the number of specialists trained annually for the national economy, science and culture increases in accordance with the growth in demand.

Article 30: Other republics

U.S.S.R.—Not present.
Ukraine—Not present.
Armenia—The reform is to be completed in 4 years. Adds that present students will be able to finish their program according to the current school plan, although practical labor training will be added.
Azerbaidzhan—Adds that present students will be able to finish their program according to the current school plan, although practical labor training will be added. New study plans to be introduced in 1960–61.
Belorussia—Almost identical to Armenia.
Estonia—Same as Azerbaidzhan. New study plans to be introduced in 1959–60.
Georgia—Same as Azerbaidzhan. New study plans to be introduced in 1959–60.
Kazakhstan—Same as Azerbaidzhan. New study plans to be introduced in 1959–60.
Kirgizia—Same as Azerbaidzhan. New study plans to be introduced in 1959–60.
Latvia—Same as Azerbaidzhan. New study plans to be introduced in 1960–61.
Lithuania—Same as Azerbaidzhan. New study plans to be introduced in 1960–61.
Moldavia—Same as Azerbaidzhan. New study plans to be introduced in 1959–60.
Tadzhikistan—Same as Azerbaidzhan. New study plans to be introduced in 1960–61.
Turkmenia—The reform will take 4 to 5 years.
Uzbekistan—Same as Azerbaidzhan. New study plans to be introduced in 1959–60.

NOTE.—The republics postponing the introduction of new study plans until 1960–61 usually do so only for those entering secondary specialized educational establishments with *completed* secondary education.

Article 31: RSFSR

The Council of Ministers of the RSFSR is to work out and carry out a set of measures for the further development of secondary specialized education in the republic, taking into consideration the introduction of the following measures:

(a) The network of secondary specialized educational establishments should be reorganized in a more orderly fashion [*uporiadochenie*], and individual educational establishments should be located in closer proximity to production enterprises for specialists in economic administrative regions and widening the practice of cooperation among regional economic councils, ministries and departments in the training of specialists with secondary specialized education.

(b) The expansion and improvement of extension-correspondence and evening education should be undertaken and they are to become major types of training of specialists with secondary specialized education. The improvement of the material-technical base of these facilities should take place. Extension-correspondence and evening divisions should be organized at regular [*statsionarnye*] educational establishments which have qualified teachers and a corresponding study base. Proper conditions should be established for the

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publication by the individual technicums [secondary specialized educational establishments] of the study and methodological materials [for extension-correspondence training].

(c) There is to be undertaken construction of educational facilities and dormitories for students, the organization of study workshops and repair facilities attached to industrial technicums where the industrial output is to be produced by the students themselves and of agricultural enterprises at agricultural technicums where all work is to be performed by students; and the creation of the needed laboratories, study rooms providing them with the needed equipment.

(d) There are to be established work places in industrial enterprises, construction projects and offices for students of secondary specialized educational establishments for the duration of their training without leave from active employment and, similarly, work places for study and industrial practice.

Article 31: Other republics

U.S.S.R.—Clause (d) is not present.
Ukraine—Same as U.S.S.R., but adds Georgian clause (below).
Armenia—Identical to RSFSR.
Azerbaidzhan—Same as Georgia.
Belorussia—Identical to RSFSR.
Estonia—Adds that in individual cases it is expedient to organize a single shop to serve several schools or technicums. Also that extension-correspondence students must be guaranteed school materials in Estonian as well as Russian and that movies, TV and radio should be used in teaching them.
Georgia—Adds a clause on the use of movies, TV, etc. in all specialized secondary education.
Kazakhstan—Similar to Georgia. Also omits clause (d) while adding that collective farms should grant successful working collective farmers the privileges established for workers and employees.
Kirgizia—Same as Georgia.
Latvia—Same as Georgia.
Lithuania—Adds a phrase about removing excess parallelism in the preparation of technicians. Otherwise same as Georgia.
Moldavia—Almost identical to Kazakhstan.
Tadzhikistan—Same as Georgia.
Turkmenia—Same as Georgia.
Uzbekistan—Calls for relocating agricultural technicums in large collective farms and state farms. Otherwise same as Georgia.

Part IV.—HIGHER EDUCATION

Article 32: RSFSR

The further development and improvement of the system of higher education in the RSFSR is to secure better practical and theoretical preparation of specialists, a considerable strengthening of the communist upbringing of youth, and the active participation of all teaching personnel in the character education of students.

The chief tasks of higher education are:

To train highly qualified specialists brought up on the basis of Marxist-Leninist teachings who have a high mastery of the latest achievements of domestic and foreign science and technology and a good working knowledge of their specialty and are capable not only of making the fullest use of modern techniques but also of creating the techniques of the future;

to carry out scientific research contributing to the fulfillment of the tasks of communist construction;

to train scientific and pedagogical personnel;

to raise the qualifications of specialists working in various branches of the economy, culture and education;

to disseminate scientific and political knowledge among the working people.

Article 32: Other republics

U.S.S.R.—Almost identical to RSFSR.
Ukraine—Almost identical to RSFSR.
Armenia—Almost identical to RSFSR.
Azerbaidzhan—The section about the "chief tasks" is omitted.
Belorussia—Almost identical to RSFSR.
Estonia—Almost identical to RSFSR.,
Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—Identical to RSFSR.
Latvia—Identical to RSFSR.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Identical to RSFSR.
Turkmenia—Identical to RSFSR.
Uzbekistan—Identical to RSFSR.

Article 33: RSFSR

The training of specialists in higher educational institutions shall be conducted on the foundation of a complete secondary education and shall combine instruction and socially useful work. The specific forms in which instruction is combined with practice and with labor should be determined in accord with the specific nature of the higher school, the composition of the student body and national and local factors.

Admission to higher educational institutions shall be based on recommendations provided by Party, trade union, Young Communist League and other social organizations, by directors of industrial enterprises and by collective farm boards, so that by competitive selection the people who are the most deserving, who have proved themselves in production work and who are well trained and capable shall be enrolled in the higher schools. Priority of admission to higher educational institutions shall be given to persons with a record of practical work.

Article 33: Other republics

U.S.S.R.—Identical to RSFSR.
Ukraine—Almost identical to RSFSR.
Armenia—Adds that leaders of enterprises, institutions, collective farms, etc. create for working youth the necessary conditions for preparation for entrance to higher educational establishments.
Azerbaidzhan—Same as Armenia.
Belorussia—Same as Armenia.
Estonia—Same as Armenia.
Georgia—Same as Armenia.
Kazakhstan—Adds that preference is to be given to those with work experience and to girls of the local nationality, particularly those from rural areas. Otherwise, same as Armenia.
Kirgizia—Adds (1) that secondary schools should actively participate in the preparation of working youth for higher educational establishments and that the pedagogical councils give recommendations to the graduates manifesting particular capabilities; (2) girls of the local nationality who pass the entrance examinations are to be admitted regardless of their production experience.
Latvia—Same as Armenia.
Lithuania—Same as Armenia.
Moldavia—Same as Armenia.
Tadzhikistan—Same as Armenia, except that there is a clause similar to Kirgizia. It also uses the phrase "make acceptances outside the competitive requirement" for those passing the entrance examinations.
Turkmenia—Calls for a widening of the preparation of specialists from among Turkmen girls. Higher educational establishment leaders should attract these girls to the higher educational establishments, and create the necessary conditions for them. Otherwise, same as Armenia.
Uzbekistan—Same as Armenia. (Nothing about local girls.)

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Article 34: RSFSR

It is deemed necessary that all steps are to be undertaken for the improvement and expansion of evening and extension-correspondence education in the RSFSR.

In order to expand the opportunity for receiving higher education without leaving active employment by all citizens and for the purpose of bringing the training of specialists closer to the residents of individual economic [administrative] regions, there shall be established centers of extension-correspondence and evening education in large cities.

The Council of Ministers of the RSFSR is to undertake measures to strengthen extension-correspondence and evening higher educational establishments, to develop a network of evening and extension-correspondence facilities attached to regular [*statsionarnykh*] higher educational establishments, to organize evening and extension-correspondence training of specialists directly at large industrial and agricultural enterprises, to provide higher educational establishments with the opportunities to use local radio and TV transmission facilities for serving extension-correspondence students, to improve the trade distribution of textbooks and study materials.

Collective farms are to be advised that they are to offer to extension-correspondence students who are members of collective farms the same benefits [*l'goty*, i.e., paid leaves for study etc.] as those enjoyed by extension-correspondence students who are employed in industrial enterprises.

Article 34: Other republics

U.S.S.R.—Paragraphs 2 and 4 are absent, as is the phrase about the improvement in the distribution of school literature.
Ukraine—Paragraph 2 is omitted, but it is added that the most highly qualified teachers should be assigned to evening and extension-correspondence schools.
Armenia—Paragraph 2 is omitted as is the phrase about radio, TV and school literature.
Azerbaidzhan—Paragraph 2 is omitted.
Belorussia—Paragraph 2 is omitted.
Estonia—Paragraph 2 is omitted.
Georgia—Paragraph 2 is omitted.
Kazakhstan—Paragraph 2 is omitted.
Kirgizia—Same as Armenia.
Latvia—Paragraph 2 is omitted.
Lithuania—Paragraph 2 is omitted.
Moldavia—Not present.
Tadzhikistan—Same as Armenia.
Turkmenia—Paragraph 2 is omitted.
Uzbekistan—Same as Armenia.

Article 35: RSFSR

The theoretical and practical preparation of specialists in higher educational establishments is to be improved.

The teaching of special subjects is to be conducted on the basis of broad general scientific and technical preparation of students with reliance upon the newest discoveries of domestic and foreign science and technology. The most important condition for the training of high-quality specialists is the integration of students in the research and experimental work of the departments and laboratories of higher educational establishments.

Article 35: Other republics

U.S.S.R.—Not explicitly present. Implicit in Article 27 and elsewhere of the U.S.S.R. law.
Ukraine—Same as U.S.S.R.
Armenia—Almost identical to RSFSR.
Azerbaidzhan—Almost identical to RSFSR.
Belorussia—Almost identical to RSFSR.
Estonia—Same as U.S.S.R.
Georgia—Same as U.S.S.R.
Kazakhstan—Same as U.S.S.R.
Kirgizia—Almost identical to RSFSR.
Latvia—Same as U.S.S.R.
Lithuania—Almost identical to RSFSR.
Moldavia—Same as U.S.S.R.
Tadzhikistan—Same as U.S.S.R.
Turkmenia—Same as U.S.S.R.
Uzbekistan—Same as U.S.S.R.

Article 36: RSFSR

The system of higher technical [engineering] education is to be further perfected, taking into consideration the requirements of economic [administrative] regions. The number of specialists trained in new technical [engineering] fields is to be increased. It is considered desirable to expand polytechnical institutes, which train engineers of various types, on the basis of a broad general scientific and general engineering preparation.

In the training of engineers the combination of instruction and labor activity is to be set up in such a way that the productive work of students will aid them in a better acquaintance with their future specialty and will offer them the opportunity to study step by step the technological processes of production. In the majority of engineering higher educational establishments it is deemed desirable to unite study with active employment in production during the first two years of study under a system of evening or extension-correspondence education.

In a number of specialties in which the students first study a group of complicated theoretical subjects and also have a heavy schedule of laboratory work, it is advisable for them to take time out from production for the first two or three years of schooling. After this the students should be provided practical work for a year in staff jobs in production, laboratories or design bureaus.

The regional economic councils in economic administrative regions should take an active part in the training of engineering specialists in higher educational establishments and aid higher educational establishments in recruiting for teaching the leading specialists in industry, in equipment laboratories, study rooms and shops, in organization of production training of students and in determining the demand for specialists in accordance with the requirements of the economic regions.

Article 36: Other republics

U.S.S.R.—Paragraphs 1 and 4 are not present.
Ukraine—Nothing about a wide scientific and technical base, nor about the participation of the regional economic councils. Adds that in specialties with seasonal production, this should be taken into account in setting up the teaching program.
Armenia—Instead of a majority of engineering higher educational establishments having the first 2 years being extension-correspondence or evening, it states that this will be the case for "some" engineering divisions. Last paragraph is omitted.
Azerbaidzhan—Instead of a majority of engineering higher educational establishments, it says "higher educational establishments of the republic which train engineers . . ." Nothing about developing polytechnical institutes.
Belorussia—The sentences about engineering higher educational establishments and polytechnical institutes, as well as the third and fourth paragraphs are omitted.
Estonia—Tallin Polytechnical Institute will teach students of the first 2 years by extension-correspondence or in the evening. Nothing about the development of polytechnical institutes. The fourth paragraph is omitted.
Georgia—Nothing about the development of polytechnical institutes.
Kazakhstan—Same as Georgia, except that the fourth paragraph is omitted.
Kirgizia—Similar to Estonia (Frunze Polytechnical Institute). Adds that great attention must be given to the preparation of engineers among Kirgiz youth.
Latvia—All students of Riga Polytechnical Institute (except

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for a significant number of extension-correspondence and evening school students) should begin studies with a leave from active employment. After 3 or 4 years of study, there will be 6-12 months of practice. In the lower courses 3 months a year practice except in the construction department, where there are alternating semesters of work and study. Otherwise similar to Kazakhstan exceptions.

Lithuania—Similar to Estonia (Kaunas Polytechnical Institute).

Moldavia—Same as U.S.S.R.

Tadzhikistan—Same as Georgia.

Turkmenia—States only that the joining of study and labor is to be done in such a way that the engineers will best master their specialty and that they will have the chance to study the technological process of production.

Uzbekistan—Same as Georgia.

Article 37: RSFSR

It is deemed desirable to organize in the territory of the RSFSR a network of institutions called technical higher educational establishment-plant [*zavod-vtuz*] as one of the forms of training highly qualified engineers. Technical higher educational establishment-plants are to be organized through transfer into the jurisdiction of the higher educational establishments of the industrial plants, through expansion and the establishment of large manufacturing facilities and shops equipped with the most modern technology at the higher educational establishments, and also through the establishment of divisions and branch offices of engineering higher educational establishments at the industrial enterprises.

Article 37: Other republics

U.S.S.R.—The essence of the article is present, but in less detail.

Ukraine—Same as U.S.S.R.

Armenia—Same as U.S.S.R.

Azerbaidzhan—Same as U.S.S.R.

Belorussia—Same as U.S.S.R.

Estonia—In essence the same, but the words "technical higher educational establishment-plant" are not used.

Georgia—Not present.

Kazakhstan—Same as U.S.S.R.

Kirgizia—Not present.

Latvia—Same as U.S.S.R.

Lithuania—Same as Estonia.

Moldavia—Same as Estonia.

Tadzhikistan—Not present.

Turkmenia—Not present.

Uzbekistan—Same as U.S.S.R.

Article 38: RSFSR

The training of agricultural specialists is to be conducted in institutes organized on the basis of large state farms or farms which have extensive model facilities for instruction in which the students themselves are to work. The training of agricultural specialists is to be adjusted to some extent to the individual regional [climate, etc.] zones of the RSFSR and the combining of education with productive labor is to be structured in accordance with the seasonal pattern of agricultural production.

The Council of Ministers of the RSFSR shall undertake measures to reorganize agricultural institutes by transferring those which are now located in large cities to state farms, by merging a number of [agricultural] research institutes and experimental stations with higher educational establishments, and by transforming the higher educational establishments into large zonal research centers.

Article 38: Other republics

U.S.S.R.—Second paragraph not present.

Ukraine—Same as U.S.S.R.

Armenia—Same as U.S.S.R.

Azerbaidzhan—This is not included. The Azerbaidzhan law states, however, that there will be created at agricultural institutes a large-scale model study-enterprise where all work will be done by the students.

Belorussia—Paragraph 2 is not included, while the preparation on state farms, etc. is coupled with large-scale, model study enterprises.

Estonia—Similar to Azerbaidzhan.

Georgia—Same as U.S.S.R.

Kazakhstan—Same as U.S.S.R.

Kirgizia—Same as U.S.S.R.

Latvia—Not present. Instead the Latvia law states that the preparation of agricultural specialists is to be carried out in the Latvian Agricultural Academy with the period of study in all divisions 6 years. Students of lower courses participate in agricultural practice as agricultural workers. Will accept students in extension-correspondence department in all specialties covered in the full-time departments.

Lithuania—Similar to Azerbaidzhan.

Moldavia—Similar to Lithuania.

Tadzhikistan—Same as Belorussia.

Turkmenia—Same as Azerbaidzhan.

Uzbekistan—Almost identical to RSFSR.

Article 39: RSFSR

It shall be considered essential to further expand university education in the RSFSR, increasing substantially the number of specialists trained in new branches of mathematics, biology, physics, chemistry; to intensify the theoretical and practical preparation of students, and to give the universities a much larger role in solving the most important problems of the natural sciences and the humanities.

The network of universities in the RSFSR and particularly its eastern [i.e., Asiatic] regions shall be strengthened. Universities should be developed as large research centers, as well as centers for training and retraining [improvement of qualifications] specialists.

The role of universities in training high-quality teachers for schools who have a broad scientific and pedagogical preparation should be expanded.

The education of students in universities should be organized in such a way that in the course of study, students acquire the work habits of their future specialty.

Article 39: Other republics

U.S.S.R.—Paragraphs 2 and 3 are not present.

Ukraine—Paragraph 2 is absent.

Armenia—Same as Ukraine.

Azerbaidzhan—Same as Ukraine.

Belorussia—Same as U.S.S.R.

Estonia—Same as Ukraine.

Georgia—Same as Ukraine.

Kazakhstan—Same as Ukraine.

Kirgizia—Same as the U.S.S.R.

Latvia—Universities should accept students only after 2 years of work, except in the specialties of physics, mathematics, biology and chemistry. Teaching in the day faculty is to be organized thus: first 3 years—study, general and specialized; next 1 to 1½ years as practicing apprentices, continuing school in the evening or by extension-correspondence; last 1–2 years of study in specialized discipline, do the thesis-project and pass the state examinations. The last stage can be by extension-correspondence if the student desires. Paragraphs 2, 3 and 4 are omitted.

Lithuania—Same as U.S.S.R.

Moldavia—Same as Ukraine.

Tadzhikistan—Adds "economics" to the list of preferred subjects. Otherwise same as Ukraine.

Turkmenia—Same as Ukraine.

Uzbekistan—Same as Ukraine.

Article 40: RSFSR

It is considered essential that the preparation of teachers

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in pedagogical institutes and universities be improved. Beginning with 1959, the training of teachers for elementary schools should be gradually transferred to higher educational establishments so that in the future a full transition will be made to staffing schools with teachers with completed higher education. Starting with 1959 the training of school teachers in agronomy, animal breeding, technology and other [applied] specialties is to be organized. The scientific-theoretical level of instruction in pedagogical institutes is to be improved. The role of production and pedagogical experience in the training of teachers is to increase.

In selecting students for higher educational establishments training teachers, the specific occupational attributes of the profession are to be taken into consideration. Pedagogical institutes are to admit preferably those persons who have already had experience in socially useful labor and especially experience in working with children. The role of the school in choosing prospective students for teachers is to be increased.

It is considered desirable to organize at pedagogical institutes divisions for the improvement of qualification [retraining] of teachers, gradually concentrating all the work for retraining [improving the qualifications of] teachers in pedagogical institutes.

Article 40: Other republics

U.S.S.R.—The date 1959 is not mentioned. Paragraphs 2 and 3 are not present.
Ukraine—The date 1959 is not mentioned. Paragraph 3 is absent, as is the sentence about the role of the schools in choosing students for teachers.
Armenia—The date 1959 is not mentioned for the elementary schools. However, the preparation of teachers in technical subjects will begin in 1959 and will be carried out in the Erevan agricultural and polytechnical institutes.
Azerbaidzhan—Same as Ukraine.
Belorussia—The date 1959 is not mentioned.
Estonia—Same as Belorussia.
Georgia—Same as Belorussia.
Kazakhstan—Same as the Ukraine.
Kirgizia—Same as the Ukraine.
Latvia—Similar to U.S.S.R. Adds that evening and extension-correspondence pedagogical education should be widened and that there will be created a network of consultation offices at higher educational establishments and secondary specialized educational establishments particularly for teachers who do not have a higher education or who wish to learn another specialty.
Lithuania—The date 1959 is not mentioned and Paragraph 3 is absent.
Moldavia—The date 1959 and the sentence about the role of schools in choosing students for teachers are absent.
Tadzhikistan—Teachers in the subject of fundamentals of production are to be prepared both in the pedagogical institutes and other higher educational establishments. The date 1959 is not mentioned.
Turkmenia—Same as Belorussia.
Uzbekistan—Paragraph 3 is absent.

Article 41: RSFSR

In the training of physicians in the higher medical schools the specific requirements of the medical profession shall be taken into consideration; priority of admission to medical institutes shall be given to young people who have a record of practical work as junior personnel in medical and health institutions; instruction shall be combined with continuous practical work in medical and health institutions or institutions of hygiene.

Instruction which does not require time out from production shall be organized at the higher medical schools for persons with a secondary medical education and a record of practical work in a specialty.

Article 41: Other republics

U.S.S.R.—Identical with RSFSR.
Ukraine—Identical with RSFSR.
Armenia—Identical with RSFSR.
Azerbaidzhan—Identical with RSFSR.
Belorussia—Identical with RSFSR.
Estonia—Identical with RSFSR.
Georgia—Identical with RSFSR. ,
Kazakhstan—Identical with RSFSR.
Kirgizia—Identical with RSFSR.
Latvia—Identical with RSFSR.
Lithuania—Identical with RSFSR.
Moldavia—Identical with RSFSR.
Tadzhikistan—Identical with RSFSR.
Turkmenia—Identical with RSFSR.
Uzbekistan—Identical with RSFSR.

Article 42: RSFSR

Training in higher educational establishments of specialists for employment in institutions of cultural services and arts is to be undertaken on the basis of accepting graduates of general secondary education as well as specialized secondary schools.

In the training of specialists with higher education in music, painting, drama and other fields of expressive arts, the system of studying without taking time out from production must be widely introduced to assure that large numbers of working people will have an opportunity to obtain an education of this kind and that the talent which exists among the people will be brought out.

It is essential to expand in cultural service and art higher educational establishments the training of teachers for schools and preschool institutions, and of organizers [leaders] of choir, drama and other performing art groups, including amateur groups.

Article 42: Other republics

U.S.S.R.—Paragraphs 1 and 3 are not present.
Ukraine—Paragraph 1 is absent.
Armenia—Identical to RSFSR.
Azerbaidzhan—Same as U.S.S.R.
Belorussia—Identical to RSFSR.
Estonia—Same as Ukraine.
Georgia—Identical to RSFSR.
Kazakhstan—Same as Ukraine.
Kirgizia—Same as Ukraine.
Latvia—Same as U.S.S.R.
Lithuania—Same as Ukraine.
Moldavia—Same as Ukraine.
Tadzhikistan—Present only in rudimentary form.
Turkmenia—Same as Ukraine.
Uzbekistan—Same as Ukraine.

Article 43: RSFSR

For the training of specialists in physical culture at higher educational establishments the evening and extension-correspondence forms of education are to be expanded and programs for the improvement of qualification [retraining] of specialists employed in physical culture and sports are to be set up.

Considering the specific requirements in preparing teachers and instructors in physical culture and coaches [trainers] for various sports, the institutes and divisions of physical culture are to select their students primarily from among those youths who have a high degree of physical [and sport] preparation and who demonstrate ability in coaching and teaching activity. The level of academic and pedagogical preparation for teachers of physical education and sports coaches is to be increased.

Article 43: Other republics

U.S.S.R.—Not present.
Ukraine—Identical to RSFSR.

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Armenia—Identical to RSFSR.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Identical to RSFSR.
Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—Identical to RSFSR.
Latvia—Not present.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Present only in rudimentary form.
Turkmenia—Nothing about extension-correspondence or evening forms.
Uzbekistan—Similar to Turkmenia.

Article 44: RSFSR

The transition to the new curricula and programs of study in higher educational establishments is to be completed in 3 to 5 years. Starting with the academic year 1959–60 the study of first-year students in all higher educational establishments will begin in accordance with the programs developed under the directives of this law.

Article 44: Other republics

U.S.S.R.—Doesn't explicitly state that the teaching of first-year students in 1959–60 will be conducted on the basis of new school plans, but it does state that the reform will begin in 1959–60.
Ukraine—Similar to U.S.S.R.
Armenia—The reorganization will begin in 1959–60 and be completed in 5 years.
Azerbaidzhan—Similar to U.S.S.R.
Belorussia—The reform is to begin in 1959–60 and be completed in 4 years, insuring that the number of graduates continually rises.
Estonia—Same as U.S.S.R.
Georgia—Same as U.S.S.R.
Kazakhstan—Same as Belorussia, except that the reform is to be completed in 3 to 5 years.
Kirgizia—Same as Kazakhstan.
Latvia—Same as Kazakhstan.
Lithuania—Same as U.S.S.R.
Moldavia—Same as U.S.S.R.
Tadzhikistan—Almost identical to RSFSR, but adds that enough specialists to satisfy the growing needs must be graduated yearly.
Turkmenia—Same as Belorussia, except for completion in 4 to 5 years.
Uzbekistan—Same as U.S.S.R.

Article 45: RSFSR

It is deemed desirable to organize in higher educational establishments a network of divisions and branches for the improvement of the qualifications [retraining] of specialists who have completed higher education and are employed in various branches of the national economy, culture and public health.

Regional economic councils in the economic administrative regions, ministries, departments jointly with the higher educational establishments are to organize divisions and branches for the retraining of graduate [*diplomirovannykh*] specialists directly at the production enterprises and other organizations and to provide for this purpose the required quarters and equipment.

Article 45: Other republics

U.S.S.R.—Not present.
Ukraine—Identical to RSFSR.
Armenia—Not present.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Not present.
Georgia—Almost identical to RSFSR, but Paragraph 2 not present.
Kazakhstan—Not present.
Kirgizia—Not present.
Latvia—Not present
Lithuania—Not present.
Moldavia—Almost identical to RSFSR, but Paragraph 2 not present.
Tadzhikistan—Identical to RSFSR.
Turkmenia—Paragraph 2 not present.
Uzbekistan—Not present.

Article 46: RSFSR

It is deemed essential to expand considerably and to improve the preparation of research and pedagogical personnel through the *aspirantura*[9] programs of higher educational establishments. The system of extension-correspondence aspirantura should be expanded considerably and aspirantura students should have the opportunity to transfer into [full-time] regular [*ochnaia*] aspirantura for the completion of their training. Aspirants are to be prepared not only for employment in research establishments and teaching in higher education, but also for work in industrial and agricultural enterprises, offices and organizations.

Article 46: Other republics

U.S.S.R.—Not present.
Ukraine—Present only in rudimentary form.
Armenia—Not present.
Azerbaidzhan—Not present.
Belorussia—Adds that dissertation work should be improved.
Estonia—Not present.
Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—Not present.
Latvia—Not present.
Lithuania—Not present.
Moldavia—Same as Belorussia.
Tadzhikistan—Identical to RSFSR.
Turkmenia—Identical to RSFSR.
Uzbekistan—Not present.

Article 47: RSFSR

It shall be deemed essential to intensify the ideological and political training of students, to improve the teaching of Marxist-Leninist theory and to rear young people in the spirit of the lofty principles of Marxist-Leninist morality, in love of labor and irreconcilability to bourgeois ideology. In the higher training of specialists, serious attention must be devoted to developing in the students the scientific method of cognition, a creative approach to the sciences, a responsible attitude toward their studies and the ability to do independent work. Persons graduating from the Soviet higher school must be exemplary in fulfilling their duty to the state and society.

Article 47: Other republics

U.S.S.R.—Identical to RSFSR.
Ukraine—Identical to RSFSR.
Armenia—Identical to RSFSR.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Identical to RSFSR.
Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—Identical to RSFSR.
Latvia—Identical to RSFSR.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Paragraph 2 is not present.

[9] See detailed explanations in Ch. V.

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Turkmenia—Identical to RSFSR.
Uzbekistan—Identical to RSFSR.

Article 48: RSFSR

It shall be considered advisable to enlist on a broader scale in the teaching work of the higher educational institutions the most qualified engineers and technicians of enterprises, construction projects, design bureaus and research institutes, and also agronomists, physicians and other practical workers who can instruct in the application of advanced methods of production and in modern scientific and technological achievements.

Article 48: Other republics

U.S.S.R.—Identical to RSFSR.
Ukraine—Identical to RSFSR.
Armenia—Identical to RSFSR.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Identical to RSFSR.
Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—Identical to RSFSR.
Latvia—Identical to RSFSR.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Not present.
Turkmenia—Identical to RSFSR.
Uzbekistan—Not present.

Article 49: RSFSR

The role of the higher educational establishments in the dissemination of scientific and political knowledge among the population is to be increased. There should be organized systematic presentations of public lectures and addresses by the leading scientists of higher educational establishments. Higher educational establishments should publish [prepare] literature popularizing science. Radio and TV networks should be widely used for the presentation of lectures and addresses by research and teaching personnel on scientific and political subjects.

Higher educational establishments should organize on a broad scale lectures, seminars and practical sessions which are accessible to the general public and in which the toilers can obtain the knowledge they desire.

Universities and pedagogical institutes should set up a program for teaching foreign languages to toilers [i.e., the public].

Article 49: Other republics

U.S.S.R.—Not present.
Ukraine—Nothing about literature, radio or TV.
Armenia—Paragraph 3 is absent.
Azerbaidzhan—Paragraph 3 is absent.
Belorussia—Paragraphs 2 and 3 are absent.
Estonia—Similar to Ukraine. Paragraphs 2 and 3 absent.
Georgia—Identical to RSFSR.
Kazakhstan—Not present.
Kirgizia—Not present.
Latvia—Not present.
Lithuania—Not present.
Moldavia—Paragraphs 2 and 3 are absent.
Tadzhikistan—Nothing about radio and TV.
Turkmenia—Not present.
Uzbekistan—Paragraph 3 is absent.

Article 50: RSFSR

It shall be considered essential to increase the role of higher educational establishments in conducting scientific research which has a high theoretical level and is significant for the further development of the national economy, science and culture.

In order to bring research activity closer to the requirements of the national economy, culture and education, the ties between higher educational establishments and industrial and agricultural enterprises as well as schools and other organizations of culture and public education must be strengthened. The role of the organs of the economic administration, in planning the research in higher educational establishments, is to be expanded.

The regional economic councils in administrative economic regions, ministries, departments, organs of agricultural administration, must offer systematic aid to higher educational establishments in organizing research activity and in introducing [realizing] the results of the research into practice.

Article 50: Other republics

U.S.S.R.—Paragraph 2 of RSFSR law is not included. Added is Clause "A", that there should be an organization of "research institutions and laboratories attached to higher educational establishments."
Ukraine—Similar to U.S.S.R.
Armenia—Identical to RSFSR.
Azerbaidzhan—Paragraph 2 of RSFSR law is not included.
Belorussia—Adds U.S.S.R. Clause "A".
Estonia—Same as U.S.S.R.
Georgia—Identical to RSFSR.
Kazakhstan—Same as U.S.S.R., but adds Clause "B", that the Kazakh State Planning Commission and the Academy of Sciences will coordinate the scientific activity of the higher educational establishments with the other scientific institutions of the republic.
Kirgizia—Same as U.S.S.R.
Latvia—Paragraphs 2 and 3 of RSFSR law are omitted. Adds U.S.S.R.'s Clause "A".
Lithuania—Same as U.S.S.R.
Moldavia—Identical with RSFSR.
Tadzhikistan—Paragraph 2 of RSFSR law is omitted. Adds Kazakh Clause "B" (i.e., Tadzhik State Planning Commission).
Turkmenia—Paragraph 2 of RSFSR is omitted.
Uzbekistan—Has Kazakh Clause "B" except that the Uzbek Academy of Agricultural Sciences also is to be involved.

Article 51: RSFSR

Economic councils, enterprises, institutions and organizations shall make available to higher and secondary specialized institutions paid staff jobs and technical positions for students and shall see that the students are given production instruction, living quarters and work clothes.

Article 51: Other republics

U.S.S.R.—Identical to RSFSR.
Ukraine—Identical to RSFSR.
Armenia—Identical to RSFSR.
Azerbaidzhan—Identical to RSFSR.
Belorussia—Identical to RSFSR.
Estonia—Identical to RSFSR.
Georgia—Identical to RSFSR.
Kazakhstan—Identical to RSFSR.
Kirgizia—Identical to RSFSR.
Latvia—Identical to RSFSR.
Lithuania—Identical to RSFSR.
Moldavia—Identical to RSFSR.
Tadzhikistan—Present only in implication. Article contents are not stated directly.
Turkmenia—Identical to RSFSR.
Uzbekistan—Identical to RSFSR.

Article 52: RSFSR

The Council of Ministers of the RSFSR is to work out and introduce measures for the further development of higher education in the RSFSR, taking into consideration the following directives: (a) planning of the prospective demand

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for the training of specialists with completed higher education and planning of the proper location of higher educational establishments in conjunction with the future development of the national economy, culture and education should be improved.

(b) Work places and technical positions should be reserved in enterprises and offices for higher education students, who undertake industrial practice or who study without leave from active employment.

(c) There should be an expansion of the material and technical base of higher educational establishments and construction of new study and laboratory facilities, especially in the eastern [Asiatic] regions of the republic. The construction of dormitory facilities is to be expanded to the complete satisfaction of the need for accommodation of all out-of-town students. Manufacturing facilities are to be established for making all essential laboratory and teaching equipment, visual aids, experimental facilities and equipment required by higher educational establishments.

(d) Higher educational establishments with a single profile [i.e., specialty group] located in the same city should be merged. Furthermore, some research institutions are to be merged with higher educational establishments.

(e) Agricultural higher educational establishments are to be provided with land in accordance with the established regulations.

Article 52: Other republics

U.S.S.R.—The following clauses are different in the U.S.S.R. law: (1) adds that special publishing offices and printing facilities should be established to service higher educational establishments; (2) adds that additional benefits should be granted to students in the upper courses of higher educational establishments and technicums who study while employed; (3) omits the statement about creating production facilities at higher educational establishments.

Ukraine—Identical with U.S.S.R.

Armenia—Identical with RSFSR.

Latvia—Omits Paragraphs (a), (b), (d), and (e) of RSFSR law. Omits the statement about the need for the creation of a production base. Adds the statement about textbooks and teaching aids. Adds clause (2) of the U.S.S.R. law, but refers only to higher educational establishments and not to technicums.

Lithuania—Paragraphs (b), (d), and (e) of RSFSR law omitted. Omits also statement about the need to create a production base. Adds a statement that the "existing excessive parallelism" in the preparation of specialists with higher education should be eliminated. Adds clause (1) of the U.S.S.R. law.

Moldavia—Omits Paragraphs (b), (d) and (e) of RSFSR law. Omits the statement about the need to create a production base. Adds the clause about the need for the improvement of public food catering and the clause about the need for an abundant supply of texts and study aids.

Tadzhikistan—Omits Paragraphs (a) and (e) of the RSFSR law. Omits the statement about the need to create a production base. Adds clause about the need to improve food catering as well as clause (1) of the U.S.S.R. law.

Turkmenia—Omits Paragraphs (b), (d) and (e) of the RSFSR law. Omits the statement about the need for the creation of a production base.

Uzbekistan—Omits Paragraph (e) of the RSFSR law and the statement about the need to create a production base. Adds clause (1) of the U.S.S.R. law.

Azerbaidzhan—Nothing about dormitories. Omits Paragraphs (d) and (e) of RSFSR law. Adds clause (1) of the U.S.S.R. law.

Belorussia—Omits Paragraph (e) of the RSFSR law. Adds clause (1) of the U.S.S.R. law and adds the statement that public food catering should be improved.

Estonia—Omits Paragraphs (b), (d) and (e) of RSFSR law. Omits the statement about the construction of dormitory facilities. Omits statement that there should be production facilities created at higher educational establishments. Adds that there should be enough texts and study aids both in Estonian and Russian available to students in higher education, particularly for those studying without leaving active employment.

Georgia—Omits Paragraphs (b) and (e) of the RSFSR law. Omits the statement about the need to establish production bases at higher educational establishments. Adds that public food catering should be improved.

Kazakhstan—Omits Paragraphs (a), (b), (d) and (e) of the RSFSR law. Omits the statement about the need to create a production base. Adds clause (1) of the U.S.S.R. law as well as a statement that existing higher educational establishments should be expanded and new ones established in the region.

Kirgizia—Omits paragraphs (b), (d) and (e) of the RSFSR law. Omits the statement about the need to establish production base. Adds a clause about the need for an abundant supply of texts and study aids both in Russian and Kirgiz languages, particularly for students in evening and extension-correspondence divisions.

• • •

The individual articles of the educational reform law have been presented in this appendix using the RSFSR law as a base. The articles of the U.S.S.R. law and the laws of the other republics were then compared with the articles of the RSFSR law. The reader is reminded that in terms of time sequence, it was the U.S.S.R. law which appeared first and then the laws for the 15 republics were adopted at meetings of the Supreme Soviets of the respective republics. It is evident that the laws of the individual republics have greater similarity to the RSFSR law than to the U.S.S.R. law. The concluding statement of the U.S.S.R. law, which in shorter form is also present in all the other laws, is as follows:

The union-republic Councils of Ministers shall submit to the union-republic Supreme Soviets proposals stemming from this law which will ensure that the ties between the school and life are strengthened, that universal compulsory 8-year education is instituted and that general secondary, technical vocational, specialized secondary and higher education in the republics is expanded.

The U.S.S.R. Supreme Soviet considers that bringing the schools closer to life will create the necessary conditions for the better rearing of the growing generation, which will live and work under communism. The reorganization of the public education system will be of enormous importance to the further material and spiritual development of Soviet society, will enhance the role of the Soviet school in the education and upbringing of young people, will better assure the training of highly qualified personnel for all branches of the national economy, science and culture and will contribute in even greater measure to the growing might of the Soviet Union.

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Appendix to Chapter II

TABLE II–A–O.—Total, Urban and Rural Preschool Educational Facilities, Enrollment and Teachers in the U.S.S.R., 1914–1959

TABLE II–A–1.—Aggregate Enrollment (Full- and Part-time) of All Types in Soviet Primary and Secondary Schools, 1914, 1922–59 and 1965 Projection

TABLE II–A–2.—Total, Urban and Rural Enrollment in Primary and Secondary Schools of General Education by Type of School in the U.S.S.R., 1914, 1922–40, 1945–59

Supplement to Table II–A–2

TABLE II–A–3.—Total, Urban and Rural Enrollment in Primary and Secondary Schools of General Education in the U.S.S.R., by Level of Grades, 1914, 1922–40, 1945–59

TABLE II–A–4.—Estimates of Hypothetical Population Age Cohort of 18-Year-Olds in the Soviet Union for 1955–67

TABLE II–A–5.—Population of the U.S.S.R. by Age Groups and Sex in Accordance with the Soviet Population Censuses of 1926, 1939 and 1959

TABLE II–B–1.—General Curriculum of Soviet Primary and Secondary School as of 1947

TABLE II–B–2.—General Curriculum of Soviet Primary and Secondary School as of 1952

TABLE II–B–3.—General Curriculum of Soviet Primary and Secondary School as of 1955

Supplement to Table II–B–3

TABLE II–B–4.—General Curriculum of Soviet Primary and Secondary School as of 1957

TABLE II–B–5.—General Curriculum of Soviet Primary and Secondary School Introduced in 1959

TABLE II–C–1.—Graduations in the U.S.S.R. from the 10th Grade of the Complete Secondary School or its Equivalent, 1927–60, and 1965 Projection.

TABLE II–D–1.—Total Number of Teachers in Soviet Primary and Secondary Schools, 1914, 1922–59

TABLE II–D–2.—Distribution of Soviet Primary and Secondary School Teachers by Grade Level, Urban-Rural Employment, Sex and Experience in 1955–56

TABLE II–D–3.—Distribution of Soviet Primary and Secondary School Teachers by Grade Level, Sex, Education and Experience in 1958–59

TABLE II–D–4.—Distribution of Intermediate (5–7) and Upper (8–10) Grade Teachers by Subject Matter and Education in 1955–56

TABLE II–D–5.—Distribution of Intermediate (5–7) and Upper (8–10) Grade Teachers by Subject Matter and Education in 1958–59

TABLE II–F–1.—Number of Soviet Primary and Secondary Schools, by Type of School, 1914, 1922–59

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TABLE II–A–0.—*Total, urban and rural preschool educational facilities, enrollment and teachers in the U.S.S.R., 1914–59*

Year	Total			Urban			Rural		
	Number of nursery schools	Enrollment (thousands)	Teachers (thousands)	Number of nursery schools	Enrollment (thousands)	Teachers (thousands)	Number of nursery schools	Enrollment (thousands)	Teachers (thousands)
1914....	275	7.0	.....	.....	.....	.....	.....	.....	.....
1927....	2,155	107.5	6.1	1,932	99.1	5.8	223	8.4	.4
1932....	19,611	1,061.7	52.1	10,979	710.2	37.9	8,632	351.5	14.1
1937....	24,535	1,045.3	71.5	12,505	697.6	47.4	12,030	347.7	24.1
1940....	23,999	1,171.5	75.2	14,427	906.4	55.0	9,572	266.1	20.2
1945....	28,436	1,471.0	101.3	17,932	1,113.6	77.7	10,504	357.4	23.7
1946....	27,662	1,283.2	97.5	17,539	973.5	74.9	10,123	309.7	22.6
1947....	27,246	1,253.6	96.2	17,242	961.2	73.8	10,004	292.4	22.3
1948....	26,143	1,054.7	89.3	17,046	838.5	69.8	9,097	216.2	19.5
1949....	25,499	1,088.6	88.2	16,792	884.5	69.9	8,707	204.1	18.3
1950....	25,624	1,168.8	92.6	17,055	958.1	74.3	8,569	210.7	18.3
1951....	26,337	1,256.9	97.6	17,638	1,036.8	78.8	8,699	220.2	18.8
1952....	27,140	1,352.6	104.6	18,325	1,121.1	85.2	8,815	231.5	19.4
1953....	28,258	1,438.3	118.1	19,097	1,195.0	97.3	9,161	242.3	20.9
1954....	29,896	1,577.4	131.0	20,016	1,305.3	107.5	9,880	272.1	23.5
1955....	31,596	1,730.9	143.8	20,961	1,422.6	117.2	10,635	308.3	26.6
1956....	33,800	1,882.0	155.9	22,100	1,541.4	126.5	11,700	340.6	29.4
1957....	34,400	2,095.0	171.5	22,400	1,722.6	139.8	12,000	372.5	31.7
1958....	36,800	2,357.7	191.9	24,300	1,947.6	157.5	12,500	410.1	34.4
1959....	39,900	2,671.1	216.4	26,300	2,197.3	177.1	13,600	473.8	39.3

Sources and Notes: The statistics in this table refer to "full-time" (regular-day) nursery schools. In addition, there are so-called seasonal (or summer) supervised playgrounds and nursery schools which serve about one million children. *KS–1956*, pp. 190–91; *NKh–1956*, p. 276; *Dos–1957*, p. 349 (this source reports for 1957 the preliminary figure of 2,065,000); *SSSR–Tsif–1958*, p. 439; *NarKhoz–1959*, p. 821; *NarKhoz–1960*, pp. 736–37.

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TABLE II–A–1.—*Aggregate enrollment (full- and part-time) of all types in Soviet primary and secondary schools, 1914, 1922–59 and 1965 projection*

(All figures in thousands)

Year end	Aggregate enrollment in schools of general education			Full-time enrollment in regular schools			Part-time and adult general education schools												University preparatory schools	Vocational, trade, and secondary semiprofessional schools		Aggregate in all types	
							Total			Schools for working youth			Schools for rural youth			Schools for adults							
	Total	Grades 8–10	Grade 10 only	Total	Grades 8–10	Grade 10 only	Total	Grades 8–10	Grade 10 only	Total	Grades 8–10	Grade 10 only	Total	Grades 8–10	Grade 10 only	Total	Grades 8–10	Grade 10 only	Rabfak	SSP total	VTLR total	Total	Secondary or equivalent
	A			B			C			D			E			F			G	H	I	J	K
	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c					
1914[a]	7,896	123	.....	7,896	123	.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	36	93	8,025	(252)
1914[x]	9,656	152	.....	9,656	152	.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	54	106	(9,816)	(312)
1922	(7,366)	.....	.....	7,322	98	.....	44	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	44	.....	.....	38	.....	.....	.....	.....
1923	.....	.....	.....	7,962	.....	.....	58	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	58	.....	.....	46	.....	.....	.....	.....
1924	.....	.....	.....	9,201	140	.....	64	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	64	.....	.....	43	.....	.....	.....	.....
1925	.....	.....	.....	10,220	138	.....	69	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	69	.....	.....	47	.....	.....	.....	.....
1926	.....	.....	.....	10,730	136	.....	103	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	103	.....	.....	46	.....	.....	.....	.....
1927	11,638	170	(99)	11,466	127	50	123	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	123	.....	.....	49	189	243	(12,070)	(531)
1928	.....	.....	.....	12,068	165	.....	171	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	171	.....	.....	57	206	.....	.....	.....
1929	(13,725)	.....	.....	13,516	190	.....	209	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	209	.....	.....	70	237	323	(14,355)	.....
1930	.....	.....	.....	17,614	66	(a)	277	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	277	.....	.....	155	487	585	.....	.....
1931	.....	.....	.....	20,933	1	(a)	.....	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	(k)	.....	.....	285	707	975	.....	.....
1932	.....	.....	.....	21,397	67	(a)	.....	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	(k)	.....	.....	339	724	959	.....	.....
1933	.....	.....	.....	22,096	139	(negl.)	.....	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	(k)	.....	.....	271	589	400	.....	.....
1934	.....	.....	.....	23,539	286	23	206	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	206	.....	.....	278	671	261	.....	.....
1935	.....	.....	.....	25,555	491	51	391	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	391	.....	.....	259	713	251	.....	.....
1936	(28,333)	.....	.....	27,611	723	.....	525	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	525	.....	.....	197	769	265	.....	.....
1937	.....	.....	.....	29,562	1,013	.....	586	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	586	.....	.....	142	862	224	.....	.....
1938	.....	.....	.....	31,517	1,404	.....	751	143	3	(a)	(a)	(a)	(a)	(a)	(a)	751	143	3	108	952	242	.....	.....
1939	.....	.....	.....	32,168	1,871	.....	736	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	736	.....	.....	53	945	.....	.....	.....
1940	35,552	2,571	(475)	34,784	2,368	450	744	(203)	.....	(a)	(a)	(a)	(a)	(a)	(a)	744	203	.....	25	975	717	(37,244)	(4,263)
1945	26,808	1,091	.....	26,094	975	.....	714	(116)	(30)	348	102	26	335	(a)	(a)	31	14	4	(a)	1,008	945	(28,761)	(3,044)
1946	(29,738)	.....	.....	28,582	979	.....	1,156	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	(a)	1,175	.....	.....	.....
1947	(30,476)	.....	.....	29,470	939	.....	1,006	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	(a)	1,232	1,240	32,948	.....
1948	(32,696)	.....	.....	31,542	1,021	.....	1,157	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	(a)	1,264	.....	.....	.....
1949	(34,540)	.....	.....	33,223	1,151	.....	1,317	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	(a)	1,309	.....	.....	.....
1950	34,752	1,837	(388)	33,314	1,496	290	1,438	(341)	(98)	838	292	82	512	4	(negl.)	88	45	16	(a)	1,298	1,300	(37,350)	(4,434)
1951	(34,037)	(2,789)	.....	32,452	2,348	.....	1,585	(441)	.....	1,002	383	.....	481	2	.....	102	56	.....	(a)	1,369	.....	.....	.....
1952	(32,643)	(3,899)	.....	30,953	3,346	.....	1,690	(553)	.....	1,126	487	.....	455	2	.....	109	64	.....	(a)	1,477	.....	.....	.....
1953	(32,157)	(5,223)	.....	30,208	4,496	.....	1,949	(727)	.....	1,353	649	.....	479	5	.....	117	73	.....	(a)	1,645	.....	.....	.....
1954	31,486	5,988	(1,328)	29,553	5,145	1,100	1,933	(843)	(228)	1,417	754	195	396	7	2	121	82	31	(a)	1,839	.....	.....	.....
1955	30,070	6,159	(1,560)	28,217	5,253	1,300	1,853	(906)	(260)	1,387	799	223	345	23	5	121	84	32	(a)	1,960	.....	.....	.....
1956	30,127	6,135	(1,609)	28,185	5,040	1,300	1,942	(1,095)	(309)	1,472	894	258	345	108	16	125	93	35	(a)	2,012	1,365	(33,499)	(9,512)
1957	30,623	5,569	.....	28,692	4,350	.....	1,931	(1,220)	.....	1,508	999	.....	296	126	.....	127	95	.....	(a)	1,941	1,392	(33,956)	(8,902)
1958	31,483	4,695	.....	29,567	3,400	.....	1,916	(1,295)	.....	1,510	1,021	.....	273	141	.....	133	97	.....	(a)	1,876	904	(34,263)	(7,475)
1959	33,361	4,304	.....	31,043	2,800	.....	2,318	(1,504)	.....	1,728	1,123	.....	422	266	.....	167	115	.....	(a)	1,908	996	(36,265)	(7,208)
1965 P	45,300	8,200[a]	.....	40,500	4,500[a]	.....	4,800	3,700[a]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	(a)	.....	.....	.....	.....

Figures in ( ) are by addition or subtraction.
[x] within present boundaries of U.S.S.R.
[a] within pre-1939 boundaries of U.S.S.R.
P—Planned.

[a] none negl.—negligible [a] grades 9-11
[k] secondary education for adults included in so-called "course training" and cannot be determined statistically.

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SOURCES AND NOTES TO TABLE II–A–1

Explanation of Columns

Year End Reference.—For example, 1938 means either the academic year 1938-39, or reported date as "fall 1938" in primary sources. It also refers to the usual official procedure of reporting data "at the end of the year" (with actual statistics compiled as of either September 15 or October 20 of that year).

A abc.—Aggregate enrollment in schools of general education derived as a sum of Col. B–abc and C–abc and verified independently from primary sources.

a.—In the respective Columns A,B,C,D,E,F, aggregate enrollment.

b.—In the respective Columns A,B,C,D,E,F, enrollment in upper-grades 8–10 only.

c.—In the respective Columns A,B,C,D,E,F, enrollment in the 10th grade only.

B abc.—Regular full-time primary and secondary schools.

C abc.—Adult education of all types, sum of D, E, and F.

D abc.—Evening schools for adults—schools for working youth.

E abc.—Evening schools for adults—schools for rural youth.

F abc.—All other types of schools for adults.

G.—Rabfak—university preparatory for workers—adult education equivalent to secondary schools.

H.—"SSP"—total enrollment in secondary semiprofessional schools of all types. Since 1949 an increasingly heavy enrollment in evening and extension-correspondence divisions, i.e., part-time education, has taken place, for which adjustment was not made.

I.—"VTLR"—Total enrollment in vocational, technical and labor reserve trade schools of all types. In the pre–1940 period, enrollment in *FZO*-type schools and equivalent.

J.—Aggregate enrollment in formal education on primary and secondary level, as a sum of total enrollments Aa, G, H, I.

K.—Enrollment on secondary school level or equivalent, as a sum of upper-grade enrollment and other equivalents—Ab, G, H, I.

Place in Table *Source and Discussion*

Aa, Ab 14z, 50, 55, 56.—NKh–1957, p. 244. This source reports enrollments for 1940: total–35,328,000 and for grades 8–10–2,558,000. These two figures are slightly lower than those incorporated in the table from *Dos–1957*, p. 273 (see below).

Aa, Ab 14z, 14x, 27, 40, 45, 56.—Dos–1957, p. 273. This source (p. 274) states explicitly that the totals include schools for working and rural youth, adults and *rabfak* students.

Aa, Ab 14z, 14x, 27, 40, 45, 57.—Vestnik statistiki, No. 10, 1958, p. 91 (1956 is omitted in this source).

Aa, 36, 57.—Izvestia, Dec. 5, 1958. This source states for 1936 the figure 28,300,000, as contrasted to the 28,333,000 obtained by addition.

Aa, Ab 54.—NKh–1956, p. 222.

Aa, Ab 57.—SSSR–Tsif–1958, p. 349. Also in *Vestnik statistiki*, No. 10, 1958, p. 91.

Ba 14x, 22–40, 45–55.—KS–1956, pp. 76–77.

Ba 56.—NKh–1957, p. 246.

Ba 57.—SSSR–Tsif–1958, p. 352.

Bb 14z, 22–40, 45–55.—KS–1956, p. 122.

Bb 56.—NKh–1957, p. 246.

Bb 57 and 58.—See Appendix Table II–A–3.

Babc 27, 40, 50, 55, 56.—NKh–1957, p. 246.

Bc 33–35.—Kul't Stroi–1935, p. 17 (see also Appendix Table II–C–1).

Babc 54.—NKh–1956, p. 224.

Ca 22, 25, 28–30, 34–40, 45–55.—KS–1956, pp. 76–77.

Ca 56.—By addition of Cb and Cc.

Ca 57.—By subtraction of Bb–57 from Ab–57.

Da, Ea 45.—KS–1956, pp. 116–19.

Da, Db, Ea, Eb, Fa, Fb, 50–55.—KS–1956, pp. 116–21, 156–57.

Da, Db, Dc, Ea, Eb, Ec, Fa, Fb, Fc 45, 50, 55, 56.—NKh–1957, p. 248.

Da, Db, Dc, Ea, Eb, Ec, Fa, Fb, Fc 54.—NKh–1956, p. 225.

Ea 22–38.—Kul't Stroi–1940, p. 94.

G 22–40.—Kul't Stroi–1940, p. 100; and *KS–1956*, pp. 76–77 (figures for 22–38 same as in *Kul't Stroi–1940*, p. 100).

H 14z, 14x, 22–40, 45–58.—Appendix Table III–A–1–E and sources to it.

I 14z, 14x, 27, 40, 45, 56.—Dos–1957, p. 273.

I 57.—Vestnik statistiki, No. 10, 1958, p. 91.

I 29–38.—Kul't Stroi–1940, p. 207.

I 47.—A. N. Veselov, *Nizshee professional'no-tekhnicheskoe obrazovanie v RSFSR*, Moscow, 1955, p. 252.

I 50.—Author's estimate derived as a residual of reported grand total enrollment (37 million) minus the sum of the components.

All columns for 27, 40, 50, 53–58.—NarKhoz–1959, pp. 806–09, 814, 817.

All columns for 1959.—NarKhoz–1960, pp. 725, 732. Prior to the release of this handbook, slightly different figures were given. *Pravda*, Jan. 22, 1960 (Itogi 1959), states that the aggregate primary and secondary enrollment increased from 1958 to 1959 by 1,850,000, which would give a total of 33,333,000 for 1959. *SSSR–Tsif–1959*, p. 206, states for Ba and Ca the figures 31 million and 2.3 million respectively.

Aa 65P.—Pravda, Dec. 24, 1958 (Kairov speech) reports the grand total in all "general education schools" as 45.3 million (as compared with a chart in *Izvestia*, Dec. 5, 1958, which explicitly compares for 1936, 1957 and 1965 the "number of students enrolled in all types of general education schools" as 28.3, 30.6 and 38 to 40 million respectively [p. 4]).

Ca 65P.—Pravda, Dec. 24, 1958 (Kairov speech), states that the grand total (Aa) will be 45.3 million, of which 4.8 million will be enrolled in schools for working and rural youth.

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TABLE II–A–2.—*Total, urban and rural enrollment in primary and secondary schools of general education by type of school in the U.S.S.R., 1914, 1922–40, 1945–59*

(All figures in thousands)

Year end[a]	Aggregate enrollment			Enrollment by type of school											
				Elementary or 4-year [c]			Elementary—junior secondary or 7-year [f]			Elementary—complete secondary or 10-year [g]			Other schools (for exceptional children) [h]		
	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
1914[b]	7,896	1,779	6,117	7,030	965	6,065	230	192	38	636	621	15	.....	.....	.....
1922	7,322	1,808	5,514	5,993	958	5,035	737	378	359	592	472	120	(negl.)	(negl.)	(negl.)
1923	7,962	2,030	5,932	6,328	963	5,365	957	511	446	670	548	122	8	8	(negl.)
1924	9,201	2,292	6,909	7,182	1,012	6,170	1,292	667	625	716	601	115	12	12	(negl.)
1925	10,220	2,537	7,683	7,853	1,005	6,848	1,618	898	720	707	598	109	42	36	6
1926	10,730	2,631	8,099	8,020	940	7,080	1,846	974	872	791	666	125	73	51	22
1927	11,466	3,220	8,246	8,427	1,114	7,313	2,084	1,264	820	858	782	75	97	60	37
1928	12,068	3,360	8,708	8,770	1,090	7,680	2,204	1,297	907	978	897	81	116	76	41
1929	13,516	3,570	9,946	9,845	1,093	8,752	2,425	1,365	1,060	1,118	1,032	86	128	80	48
1930	17,614	3,825	13,789	12,850	1,059	11,791	4,194	2,361	1,832	384	337	46	187	68	119
1931	20,933	4,562	16,371	13,456	1,276	12,180	7,087	3,190	3,897	4	4	(negl.)	386	93	293
1932	21,397	4,834	16,563	12,092	1,192	10,901	7,921	2,394	5,527	1,243	1,181	62	140	68	73
1933	22,096	5,228	16,868	11,810	1,278	10,532	8,150	2,049	6,101	2,012	1,811	201	124	90	34
1934	23,539	6,062	17,476	11,076	1,462	9,614	9,168	1,955	7,213	3,170	2,532	638	125	113	11
1935	25,555	6,971	18,584	10,887	1,545	9,341	10,052	2,104	7,948	4,481	3,190	1,291	135	131	4
1936	27,611	7,841	19,770	10,876	1,586	9,290	10,670	2,153	8,518	5,971	4,022	1,949	94	81	13
1937	29,562	8,680	20,882	10,925	1,603	9,322	11,167	2,257	8,909	7,354	4,751	2,603	116	89	47
1938	31,517	9,375	22,142	10,646	1,502	9,144	11,712	2,243	9,469	9,028	5,554	3,474	131	77	54
1939[e]	32,186	9,929	22,257	9,517	1,389	9,129	11,706	2,077	9,629	10,835	6,381	4,453	128	82	46
1940[d]	34,784	10,776	24,008	9,786	1,370	8,416	12,525	2,181	10,344	12,199	7,117	5,082	274	108	166
1945	26,094	7,906	18,188	9,430	1,452	7,977	9,558	2,063	7,494	7,021	4,328	2,693	85	62	23
1946	28,582	9,292	19,290	10,499	1,868	8,631	10,456	2,497	7,959	7,551	4,874	2,677	76	54	22
1947	29,470	9,885	19,585	10,858	2,060	8,798	10,862	2,747	8,115	7,671	5,016	2,655	79	62	17
1948	31,542	10,754	20,788	10,626	2,121	8,505	12,443	3,149	9,294	8,383	5,415	2,968	90	69	21
1949	33,223	11,472	21,751	9,308	1,994	7,315	14,620	3,528	11,092	9,189	5,867	3,321	105	83	23
1950	33,314	11,751	21,563	7,518	1,641	5,877	15,509	3,640	11,869	10,171	6,380	3,791	116	91	25
1951	32,452	11,847	20,605	5,887	1,312	4,575	14,804	3,320	11,484	11,641	7,119	4,522	120	97	24
1952	30,953	11,833	19,120	4,503	1,022	3,481	13,599	3,112	10,488	12,726	7,598	5,128	125	102	23
1953	30,208	12,163	18,045	3,728	882	2,846	12,228	2,816	9,412	14,123	8,361	5,762	129	104	24
1954	29,553	12,370	17,183	3,546	841	2,705	10,729	2,451	8,278	15,149	8,974	6,174	129	104	26
1955	28,217	12,126	16,092	3,600	818	2,782	9,372	2,198	7,174	15,129	9,016	6,113	117	94	23
1956	28,185	12,385	15,800	4,060	.....	.....	8,600	.....	.....	15,400	.....	.....	125	.....	.....
1957	28,694	13,000	15,694	4,300	.....	.....	8,500	.....	.....	15,800	.....	.....	100	.....	.....
1958	29,600	13,700	15,900	4,500	.....	.....	8,900	.....	.....	16,100	.....	.....	100	.....	.....
1959	31,000	.....	.....	4,500	.....	.....	10,100	.....	.....	16,300	.....	.....	100	.....	.....

negl.—negligible.

[a] Year end refers to the fall of the corresponding academic year.

[b] Within boundaries of the U.S.S.R. prior to Sept. 17, 1939 (this refers also to all years 1922–39 inclusive).

[c] Excluding enrollment in the annexed territories.

[d] Including enrollment in annexed territories.

[e] For the period 1922–30 refers primarily to schools of the first level (*shkoly pervoi stupeni*).

[f] For the period 1922–30 refers to enrollment in combination schools, which had the first level and first concentrate of the second level schools.

[g] For the period 1922–30 refers to the combination of the first and second level schools (or the 9-year school).

[h] Schools for exceptional children are those for the deaf, mute, blind, physically handicapped and mentally retarded. Some pupils of orphanages are also included.

SOURCES AND NOTES TO TABLE II–A–2

Place in table — *Sources and discussion*

1914, 1922–56.—NKh–1957, p. 246; *KS–1956*, pp. 76–79, 80–85; *Dos–1957*, p. 274. *Note:* last-figure differences between the totals and the sum of the components, whenever they occur, are due to rounding.

1957.—NarKhoz–1959, pp. 812–13. *SSSR–Tsif–1958*, p. 352. Furthermore the following estimates are possible. *Pravda*, Dec. 20, 1957, states that 1957 enrollment was about 28,500,000. *Pravda*, July 24, 1958, states that total general school enrollment increased in 1957 as compared with 1956 by about 500,000 which is actually the approximate magnitude of change (1956: 28,185,000 plus 500,000 gives 1957 as about 28,685,000).

1958.—NarKhoz–1959, pp. 812–13. *Izvestia*, Dec. 24, 1958 (Kairov's speech at the Supreme Soviet), stated that actual enrollment in the fall of 1958 was 29,400,000. Anticipated enrollment was to be 29,900,000 (*Pravda*, Dec. 20, 1957), and actual enrollment was short thereof by half a million.

1959.—SSSR–Tsif–1959, p. 206; *NarKhoz–1960*, p. 729.

SUPPLEMENT TO TABLE II–A–2

The enrollment in 1914 within the Soviet Union's boundaries, including territories annexed after Sept. 1939, was: Total—9,656,000, of which urban was 2,249,000, rural 7,407,000. Total enrollment in 1920 was: 9,781,000 and in 1921, 8,439,000 (*NarKhoz–1932*, p. 507). The estimated enrollment during the Second World War was in 1941: 19,617,000; 1942—15,667,000; 1943—19,934,000; 1944—22,625,000 (*SPM*, pp. 264, 267).

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TABLE II–A–3.—*Total, urban and rural enrollment in primary and secondary schools of general education in the U.S.S.R., by level of grades, 1914, 1922–40, 1945–59*
(All figures in thousands)

Year end[a]	Aggregate enrollment[b]			Enrollment by level of grades								
				Grades 1–4[c]			Grades 5–7[d]			Grades 8–10[e]		
	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
1914[f]	7,896	1,779	6,117	7,390	1,354	6,036	383	305	78	123	120	3
1922	7,322	1,808	5,514	6,607	1,308	5,299	617	424	194	98	76	22
1923	7,962	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1924	9,190	2,280	6,909	8,352	1,669	6,683	692	487	205	146	125	21
1925	10,178	2,501	7,677	9,178	1,780	7,398	862	600	261	138	120	18
1926	10,657	2,580	8,077	9,462	1,766	7,697	1,059	696	363	136	118	18
1927	11,389	3,160	8,209	9,910	2,126	7,784	1,332	919	413	127	114	12
1928	11,952	3,284	8,667	10,350	2,130	8,220	1,438	1,002	435	165	152	13
1929	13,388	3,489	9,898	11,583	2,233	9,350	1,615	1,081	533	190	175	15
1930	17,427	3,757	13,670	15,385	2,538	12,847	1,976	1,163	813	66	56	10
1931	20,547	4,469	16,078	17,732	3,172	14,561	2,814	1,297	1,517	1	1	negl.
1932	21,257	4,767	16,490	17,675	3,393	14,282	3,515	1,311	2,204	67	62	5
1933	21,972	5,138	16,834	17,749	3,611	14,138	4,084	1,403	2,680	139	124	15
1934	23,414	5,949	17,465	18,280	4,115	14,165	4,848	1,604	3,244	286	230	56
1935	25,420	6,840	18,580	19,077	4,533	14,544	5,852	1,950	3,902	491	356	135
1936	27,517	7,761	19,757	20,078	4,957	15,121	6,717	2,318	4,399	723	486	237
1937	29,446	8,611	20,835	20,755	5,202	15,553	7,677	2,768	4,909	1,013	641	373
1938	31,386	9,298	22,088	21,202	5,240	15,962	8,780	3,203	5,577	1,404	855	549
1939[g]	32,058	9,847	22,211	20,472	5,165	15,307	9,715	3,578	6,137	1,871	1,103	767
1940[h]	34,510	10,668	23,842	21,375	5,335	16,041	10,767	3,965	6,802	2,368	1,369	999
1945	26,009	7,844	18,165	19,858	5,492	14,366	5,175	1,804	3,371	975	547	428
1946	28,506	9,239	19,267	22,577	6,800	15,777	4,950	1,855	3,095	979	584	395
1947	29,391	9,823	19,568	23,494	7,298	16,196	4,957	1,964	2,994	939	561	378
1948	31,452	10,685	20,767	23,732	7,394	16,338	6,698	2,694	4,005	1,021	597	424
1949	33,118	11,390	21,728	22,657	7,070	15,587	9,309	3,660	5,649	1,151	660	491
1950	33,198	11,660	21,538	19,671	6,144	13,527	12,031	4,658	7,373	1,496	858	638
1951	32,332	11,750	20,582	16,443	5,221	11,222	13,541	5,170	8,371	2,348	1,359	989
1952	30,828	11,731	19,097	13,394	4,477	8,917	14,087	5,331	8,757	3,346	1,923	1,423
1953	30,079	12,059	18,020	12,106	4,433	7,673	13,477	5,071	8,405	4,496	2,554	1,942
1954	29,424	12,266	17,158	12,663	5,103	7,560	11,616	4,299	7,317	5,145	2,864	2,281
1955	28,101	12,032	16,069	13,579	5,673	7,906	9,268	3,472	5,795	5,253	2,886	2,367
1956	28,060	12,330	15,730	15,580	6,580	9,000	7,440	3,010	4,430	5,040	2,740	2,300
1957	28,590	12,870	15,720	17,000	7,260	9,740	7,240	3,280	3,960	4,350	2,330	2,020
1958	29,600	13,700	15,900	17,700	7,600	10,100	8,400	4,100	4,300	3,400	1,900	1,500
1959	31,000	14,600	16,400	18,400	8,100	10,300	9,700	4,800	4,900	2,800	1,600	1,200

[a] Year end refers to the fall or the corresponding academic year and enrollment is reported variably as of Sept. 15 to Nov. 1 of the year.
[b] Aggregate enrollment excludes pupils of schools for exceptional children and thus differs from aggregate enrollment reported in Table II–A–2 for most years by the number of pupils enrolled in such schools (Column "Other Schools" in Table II–A–2).
[c] Figures include preparatory grade where it exists (also known as "zero grade" in the 1920's and 1930's). For the period of the 1920's the data refer to schools of the first level (*shkoly pervoi stupeni*) or first concentration (*pervyi kontsentrat*).
[d] For the period of the 1920's statistics refer to lower forms of schools of the second level (*shkoly vtoroi stupeni*) or second concentration (*vtoroi kontsentrat*).
[e] For the period of the 1920's statistics refer to upper forms of the schools of the second level or third concentration (*tretii kontsentrat*). Figures refer to Grades 8–11 whenever applicable.
[f] Enrollment within pre-1939 Soviet boundaries.
[g] Exclusive of territorial annexations in 1939–40.
[h] Enrollment within the present boundaries. Including annexations after Sept. 17, 1939.

SOURCES AND NOTES TO TABLE II–A–3

1914, 1922–55: *KS–1956*, pp. 122–23; 1956: *NKh–1957*, p. 246. 1957 and 1958: *NarKhoz–1959*, pp. 814–15. 1958 and 1959, as well as earlier years from *NarKhoz–1960*, p. 730. NOTE: —Last-figure differences between the totals and the sum of the components, whenever they occur, are due to rounding.

Before the appearance of *NarKhoz–1959* and *NarKhoz–1960*, the following estimates were made for 1957 and 1958:

Estimate of 1957 total enrollment: Reported total enrollment (including schools for the physically handicapped) was 28,694,000 (*SSSR–Tsif–1958*, p. 352). Assuming the figure 125,000 (as in 1956) for schools for the physically handicapped, we obtain about 28,570,000 for total enrollment by grade. The actual enrollment now reported in *NarKhoz–1959* is 28,600,000.

Estimate of 1958 total enrollment: Reported total enrollment is 29,400,000 (*Izvestia*, Dec. 24, 1958). Making an allowance of 100,000 for schools for handicapped children, we obtain about 29,300,000 for total enrollment by grade. The actual enrollment now reported in *NarKhoz–1959* is 29,500,000.

Estimate of 1957 enrollment in grades 8–10: At the 13th Congress of the Komsomol its secretary, A. N. Shelepin, stated that "in the current academic year there were about [slightly more than] 4,000,000 students in grades 8–10." This statement, which reveals a decline in upper-grade enrollment by about 1,000,000 between the fall of 1956 and of 1957, may be checked as follows. Enrollment in grades 8–10 in the fall of 1957 in schools under the jurisdiction of the Ministry of Education of the Russian SFSR was 2,123,000 (*Uchitel'skaia gazeta*, April 3, 1958; Minister of Education E. I. Afanasenko's speech), as compared with 2,561,200 a year earlier (*KS–RSFSR–1958*, pp. 204–05). Note that references are to schools under the RSFSR Ministry of Education only. The Ministry of Railroads of the U.S.S.R. controls additional schools (total enrollment in grades 8–10 in 1956 was 2,728,800). Assuming the RSFSR's proportion in the U.S.S.R.'s total was 50.8 percent (as it was in 1956), we obtain an estimated

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enrollment in grades 8–10 of 4,180,000 for 1957. This latter figure is in close agreement with the statement by Shelepin. The actual enrollment now reported in *NarKhoz–1959* is 4,350,000.

Estimate of 1958 enrollment in grades 8–10: The 1958 enrollment in grades 8–10 may be derived in two ways. *Izvestia,* Dec. 24, 1958 (Kairov's speech), states that enrollment in grades 1–7 in 1958 was 26,000,000. Subtracting this from the total enrollment, we get 3,400,000. The second way is more complicated. 1958 enrollment in the RSFSR (all types of schools) in all grades was 16,500,000, and in grades 1–7 was 14,900,000 (*Izvestia,* Dec. 25, 1958 [Afanasenko's speech]). Thus in grades 8–10 there were 2,600,000 students in general education and working and rural youth schools. The estimated enrollment in grades 8–10 of working and rural youth schools was 650,000 (25 percent of the total enrollment in grades 8–10). Thus enrollment in grades 8–10 of regular schools was 1,950,000. The RSFSR accounts for 54 percent of the U.S.S.R.'s enrollment in grades 8–10, and therefore the estimate of 1958 enrollment in grades 8–10 *for the U.S.S.R. is 3,611,000.* The estimate of 3,600,000 was incorporated into the table. Enrollment in grades 8–10 in schools for working and rural youth was about 1,500,000. Total upper-grade enrollment in all types of schools was about 5,100,000. Apparently by withholding recent figures and aggregating enrollment in various schools, what the Russians are trying to do is to conceal the drop in enrollment in the upper grades. Should the statistics be released in the future, this drop will become evident. The actual enrollment now reported in *NarKhoz–1959* is 3,400,000.

TABLE II–A–4.—*Estimates of hypothetical population age cohort of 18-year-olds in the Soviet Union for 1955–67*
(All figures rounded in millions)

Year	Actual enrollment, grades 1–4	Hypothetical population estimates by age groups						Year
		Age group 7–10	9 yr.	Age group 7–10	9 yr.	18-year-olds		
	X	A	AI	B	BI	AII	BII	
1946.....	22.6	18.08	4.52	18.83	4.70	4.38	4.55	1955
1947.....	23.5	18.80	4.70	19.58	4.89	4.55	4.74	1956
1948.....	23.7	18.96	4.74	19.75	4.94	4.59	4.78	1957
1949.....	22.7	18.16	4.54	18.91	4.73	4.40	4.58	1958
1950.....	19.7	15.76	3.94	16.41	4.10	3.81	3.97	1959
1951.....	16.4	13.12	3.28	13.66	3.41	3.18	3.30	1960
1952.....	13.4	10.72	2.68	11.16	2.79	2.60	2.70	1961
1953.....	12.1	9.68	2.42	10.08	2.52	2.34	2.44	1962
1954.....	12.7	10.16	2.54	10.66	2.66	2.46	2.57	1963
1955.....	13.6	10.88	2.72	11.33	2.83	2.63	2.74	1964
1956.....	15.6	12.48	3.12	13.00	3.25	3.02	3.15	1965
1957.....	17.0	13.60	3.40	14.66	3.66	3.29	3.55	1966
1958.....	18.0[a]	14.40	3.60	15.00	3.75	3.49	3.63	1967

[a] Officially reported in *NarKhoz–1959,* as 17,700,000.

SOURCES AND NOTES TO TABLE II–A–4

X.—Actual enrollment. Data same as in appendix table II–A–3 above. These estimates were made on the basis of data prior to the publication of *NarKhoz–1959,* where enrollment in grades 1–4 for 1958 was reported as 17,700,000 instead of 18,000,000 used in the table.

A.—Hypothetical age cohort of 7- to 10-year-olds derived on the assumption that school enrollment constitutes 125 percent of the respective age group.

AI.—Hypothetical age group of 9-year-olds, derived by dividing the figures in Column A by four.

B.—Hypothetical age cohort of 7- to 10-year-olds, derived on the assumption that school enrollment constitutes 120 percent of the respective age group.

BI.—Hypothetical age group of 9-year-olds derived by dividing figures in Column B by four.

AII and BII.—Hypothetical age group of 18-year-olds, derived by applying the age specific mortality rates (Lorimer, *The Population of the Soviet Union,* p. 124, which gives these rates for 1938–39 on the basis of which cumulative survival rate of 969 per 1,000 was computed for 18-year-olds upon 9-year-olds).

General note.—The estimating procedure applied above is based on the assumption of invariable correlation of school enrollment to the respective age cohort. The correlation of 124 percent was true for 1938–39 data (see *SPM,* p. 49, and text in Ch. II above), when actual enrollment was correlated with the actual population. The data for 1953–55 (*KS–1956,* pp. 172–73) suggest that the cumulative rate of repeaters in grades 1-4 would account (if no drop-outs take place because of the compulsory schooling requirement) for the swelling of the school enrollment in grades 1-4 to 129 percent of its normal size. Despite the compulsory schooling requirement, there evidently are drop-outs which reduce the correlation ratio.

The reader should be aware that these estimates are derived under simplified assumptions. A number of population studies which are made under governmental and academic auspices use Soviet school statistics for population estimates by age cohort by applying varying assumptions and variable correlation ratios. In this study it was decided to forego complicating refinements for the sake of straight-forwardness. Furthermore, it should be noted that in the opinion of this researcher, the derivations above of the hypothetical age cohort of 18-year-olds result in maximal estimates.

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TABLE II–A–5.—*Population of the U.S.S.R. by age groups and sex in accordance with the Soviet population censuses of 1926, 1939 and 1959*

(All figures in thousands)

Official census reportings of population groupings	(A) December 17, 1926			(B) January 17, 1939			(C) January 17, 1939, adjusted	(D) Estimate 1939, adjusted to postwar boundaries	(E) January 15, 1959		
	Total	Male	Female	Total	Male	Female	Total	Total	Total	Male	Female
0–9	38,593	18,888	18,705	39,308	19,765	19,543	39,833	43,476	46,363	23,608	22,755
(0–7)	.....	..	.....	31,412	.....	.....	31,595	(34,784)	(38,088)	(18,888)	(18,200)
(0–4)	22,323	11,238	11,085	21,807	11,028	10,779	.....	.....	.....	.....	.....
(5–9)	15,270	7,650	7,620	17,501	8,737	8,764	.....	.....	.....	.....	.....
10–14	17,091	8,643	8,448	20,976	10,465	10,521	(21,625)	(23,638)	(14,278)	(7,210)	(7,068)
(10–15)	.....	..	.....	.....	.....	.....	(24,665)	28,365	17,133	(8,653)	(8,480)
(8–11)	11,226	5,647	5,579	16,409	.....	.....	16,476	(20,042)	(14,982)	.....	.....
(12–14)	11,521	5,834	5,687	13,336	.....	.....	13,387	(17,019)	(8,565)	.....	.....
15–19	16,977	8,133	8,844	16,429	8,110	8,319	15,198	(17,757)	(17,530)	(8,856)	(8,674)
(16–19)	.....	..	.....	.....	.....	.....	(12,158)	13,030	14,675	7,413	7,262
(10–19)	34,068	16,776	17,292	37,415	18,575	18,840	36,823	41,395	31,808	16,066	15,742
20–24	13,813	6,712	7,101	14,371	7,164	7,207	.....	15,768	20,343	10,056	10,287
25–29	10,037	5,490	6,547	16,449	7,937	8,512	.....	18,520	18,190	8,917	9,273
(20–29)	23,850	12,202	11,648	30,820	15,101	15,719	30,903	34,288	38,533	18,973	19,560
30–34	9,065	4,297	4,768	13,735	6,541	7,194	.....	15,598	18,999	8,611	10,388
35–39	8,452	3,994	4,458	11,748	5,330	6,418	.....	12,958	11,590	4,528	7,062
(30–39)	17,517	8,291	9,226	25,483	11,871	13,612	25,521	28,556	30,589	13,139	17,450
40–44	6,955	8,393	3,562	8,520	3,748	4,772	.....	9,603	10,408	3,998	6,410
45–49	5,908	2,893	3,015	6,807	2,986	3,821	.....	7,776	12,264	4,706	7,558
(40–49)	12,863	6,286	6,577	15,327	6,734	8,593	15,334	17,379	22,672	8,704	13,968
50–54	5,041	2,343	2,698	5,977	2,690	3,287	.....	.....	10,447	4,010	6,437
55–59	4,205	1,887	2,318	4,955	2,235	2,720	.....	.....	8,699	2,906	5,793
(50–59)	9,246	4,230	5,016	10,932	4,925	6,007	10,922	12,533	19,146	6,916	12,230
60–69	6,399	2,866	3,533	7,138	3,085	4,053	.....	8,535	11,736	4,099	7,637
70 and over	3,404	1,453	1,951	4,055	1,621	2,454	.....	4,462	7,972	2,541	5,431
(60 and over)	9,803	4,319	5,484	11,193	4,706	6,487	11,185	12,997	19,708	6,640	13,068
Unspecified	88	50	38	.....	.....	.....	36	.....	8	4	4
Total population	145,028	71,043	75,985	170,467	81,665	88,802	170,557	190,678	208,827	94,050	114,777
Special population groups relevant to school attendance:											
Elementary, ages 8–11	11,226	5,647	5,579	16,409	.....	.....	16,476	(20,042)	(14,982)	.....	.....
Jr. secon., ages 12–14	11,521	5,834	5,687	13,336	.....	.....	13,387	(17,019)	(8,565)	.....	.....
Sr. secon., ages 15–17	10,684	5,159	5,525	(9,858)	.....	.....	(9,120)	(11,241)	(10,193)	.....	.....
School age, ages 8–17	33,431	16,640	16,791	39,603	.....	.....	(38,983)	(48,302)	(33,740)	.....	.....
Labor force, ages 15–60	80,453	.....	.....	98,991	.....	.....	97,878	110,873	128,470	56,588	71,882

Sources: A and B: F. Lorimer, *The Population of the Soviet Union*, Geneva: League of Nations, 1946, pp. 141, 143, 231–33. Observe that the adjusted grand total population reported is 147,000,000 for 1926. C: *Vestnik statistiki*, No. 6, 1956, p. 90. D and E: *Pravda*, Feb. 4, 1960; *NarKhoz–1960*, p. 11. Numbers in parentheses are interpolations, or are derived by addition.

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TABLE II–B–1.—*General curriculum of Soviet primary and secondary school as of 1947*

Subjects of instruction	Primary—complete secondary (10-year) school																		
	Primary—incomplete secondary (7-year) school																		
	Primary (4-year) school												Upper grades 8–10						
	Elementary grades 1–4						Intermediate grades 5–7												
	Instruction hours per week in grades:				Total, grades 1–4		Instruction hours per week in grades:			Total, grades 5–7		Total, grades 1–7		Instruction hours per week in grades:			Total, grades 8–10		Total grades 1–10	
	1	2	3	4	Hours	Per cent	5	6	7	Hours	Per cent	Hours	Per cent	8	9	10	Hours	Per cent	Hours	Per cent
Group I: General (languages, literatures, humanities and social sciences)	14	14	15	13/13	1,848	56.0	19	18	15/16	1,233	55.3	3,581	55.6	.....	.....	.....	1,486	47.6	5,067	53.0
1. Russian language and literature	14	14	15	8	1,683	51.0	10	8	6	792	25.2	2,475	38.5	1	1	1	99	3.2	2,574	26.9
2. Other literature	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	5	4	429	13.7	429	4.5
(1, 2) Total 1–2	14	14	15	8	1,683	51.0	10	8	6	792	25.2	2,475	38.5	5	6	5	528	16.9	3,003	31.4
3. Foreign language (German, French, English)	.....	.....	.....	.....	.....	.....	4	4	3	363	11.6	363	5.6	4	4/3	4	380	12.2	743	7.8
4. History	.....	.....	.....	2/3	83	2.5	2	3	2	231	7.4	314	4.9	4	4	4	396	12.7	710	7.4
5. Constitution of the U.S.S.R.	.....	.....	.....	.....	.....	.....	.....	.....	2	66	2.1	66	1.0	.....	.....	.....	.....	.....	66	0.7
6. Geography	.....	.....	.....	3/2	82	2.5	3	3	2/3	281	9.0	363	5.6	3	2/3	.....	182	5.8	545	5.7
7. Psychology	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8. Logic	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Group II: Scientific (mathematics and sciences)	7	7	6	10	990	30.0	15	11	14/13	1,105	35.2	2,095	32.6	13	13/13	14/14	1,336	42.9	3,431	35.9
9. Arithmetic	7	7	6	7	891	27.0	7	.....	.....	231	7.4	1,122	17.5	.....	.....	.....	.....	.....	1,122	11.8
10. Mathematics (algebra, geometry, trigonometry)	.....	.....	.....	.....	.....	.....	.....	6	6	396	12.5	396	6.1	6	6	6	594	19.1	990	10.4
(9, 10) Total 9–10	7	7	6	7	891	27.0	7	6	6	627	19.9	1,518	23.6	6	6	6	594	19.1	2,112	22.2
11. General science (nature studies, introductory and biology)	.....	.....	.....	3	99	3.0	2	3	2	231	7.4	330	5.1	2	2	.....	132	4.2	462	4.8
12. Chemistry	.....	.....	.....	.....	.....	.....	.....	.....	3/2	82	2.6	82	1.3	2	2/3	4/3	264	8.5	346	3.6
13. Physics	.....	.....	.....	.....	.....	.....	.....	2	3	165	5.3	165	2.6	3	3/2	4	313	10.0	478	5.0
14. Astronomy	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	33	1.1	33	0.3
Group III: Applied (activity, skill and vocational arts)	3	3	4	4	462	14.0	3	3	3	297	9.5	759	11.8	3	3	3	297	9.5	1,056	11.1
15. Physical education (including military training for boys)	1	1	2	2	198	6.0	2	2	2	198	6.3	396	6.1	2	2	2	198	6.3	594	6.3
16. Drawing	1	1	1	1	132	4.0	1	.....	.....	33	1.1	165	2.6	.....	.....	.....	.....	.....	165	1.7
17. Drafting	.....	.....	.....	.....	.....	.....	.....	1	1	66	2.1	66	1.0	1	1	1	99	3.2	165	1.7
18. Singing	1	1	1	1	132	4.0	.....	.....	.....	.....	.....	132	2.1	.....	.....	.....	.....	.....	132	1.4
19. through 24 (other subjects)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	24	24	25	27	3,300	100.0	31	32	32	3,135	100.0	6,435	100.0	32	32	32	3,119	100.0	9,554	100.0

Sources and Notes: *Medynskii–1947*, pp. 51, 64, 76. Whole numbers refer to instruction hours during each week throughout the school year. In the fractions the numerator refers to the number of instruction hours in a given subject during the weeks of the fall term; the denominator refers to the number of instruction hours during the weeks of the spring term. The academic year consists of 33 instruction weeks. Other subjects were introduced at later dates: see Table II–B–2, Table II–B–3 and Table II–B–4. The basic data for the curricular structure were reconstructed from the Soviet primary source cited; arrangement, grouping and computed distributions are those of the author.

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TABLE II–B–2.—*General curriculum of Soviet primary and secondary school as of 1952*

Subjects of instruction	Primary—complete secondary (10-year) school																			
	Primary—incomplete secondary (7-year) school																			
	Primary (4-year) school																			
	Elementary grades 1–4						Intermediate grades 5–7						Upper grades 8–10							
	Instruction hours per week in grades:				Total, grades 1–4		Instruction hours per week in grades:			Total, grades 5–7		Total, grades 1–7		Instruction hours per week in grades:			Total, grades 8–10		Total grades 1–10	
	1	2	3	4	Hours	Per-cent	5	6	7	Hours	Per-cent	Hours	Per-cent	8	9	10	Hours	Per-cent	Hours	Per-cent
Group I: General (languages, literatures, humanities and social sciences)	15	14	15	14/13	1,897	57.5	19	17/17	15/16	1,700	54.2	3,597	55.9	16/16	18/18	15	1,617	50.0	5,214	53.9
1. Russian language and literature	15	14	15	8	1,716	52.0	10	8	6	792	25.3	2,508	39.0	.....	.....	.....	.....	.....	2,508	25.9
2. Other literature	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5/6	6	5	545	16.8	545	5.6
(1, 2) Total 1–2	15	14	15	8	1,716	52.0	10	8	6	792	25.3	2,508	39.0	5/6	6	5	545	16.8	3,053	31.5
3. Foreign language (German, French, English)	.....	.....	.....	.....	.....	.....	4	4	3	363	11.6	363	5.6	4/3	3/4	4	363	11.2	726	7.5
4. History	.....	.....	.....	3	99	3.0	2	3/2	2	214	6.8	313	4.9	4	4	4	396	12.2	709	7.3
5. Constitution of the U.S.S.R.	.....	.....	.....	.....	.....	.....	.....	.....	2	66	2.1	66	1.0	.....	.....	.....	.....	.....	66	0.7
6. Geography	.....	.....	.....	3/2	82	2.5	3	2/3	2/3	265	8.4	347	5.4	3	3/2	.....	181	5.6	528	5.5
7. Psychology	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	66	2.0	66	0.7
8. Logic	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	66	2.0	66	0.7
Group II: Scientific (mathematics and sciences)	6	7	6	9/10	941	28.5	9	12	14/13	1,138	36.3	2,079	32.3	13	12	15/15	1,320	40.8	3,399	35.2
9. Arithmetic	6	7	6	7	858	26.0	7	2	.....	297	9.5	1,155	17.8	.....	.....	.....	.....	.....	1,155	12.0
10. Mathematics (algebra, geometry, trigonometry)	.....	.....	.....	.....	.....	.....	.....	5	6	363	11.6	363	5.6	6	6	6	594	18.4	957	9.9
(9, 10) Total 9–10	6	7	6	7	858	26.0	7	7	6	660	21.1	1,518	23.5	6	6	6	594	18.4	2,112	21.9
11. General science (nature studies, introductory and biology)	.....	.....	.....	2/3	83	2.5	2	3	2	231	7.4	314	4.9	2	2	.....	132	4.1	446	4.7
12. Chemistry	.....	.....	.....	.....	.....	.....	.....	.....	3/2	82	2.6	82	1.3	2	2	4/3	247	7.6	329	3.4
13. Physics	.....	.....	.....	.....	.....	.....	.....	2	3	165	5.2	165	2.6	3	2	4/5	314	9.7	479	4.9
14. Astronomy	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	33	1.0	33	0.3
Group III: Applied (activity, skill and vocational arts)	3	3	4	4	462	14.0	3	3	3	297	9.5	759	11.8	3	3	3	297	9.2	1,056	10.9
15. Physical education (including military training for boys)	1	1	2	2	198	6.0	2	2	2	198	6.3	396	6.2	2	2	2	198	6.1	594	6.1
16. Drawing	1	1	1	1	132	4.0	1	1	.....	66	2.1	198	3.1	.....	.....	.....	.....	.....	198	2.0
17. Drafting	.....	.....	.....	.....	.....	.....	.....	.....	1	33	1.1	33	0.5	1	1	1	99	3.1	132	1.4
18. Singing	1	1	1	1	132	4.0	.....	.....	.....	.....	.....	132	2.0	.....	.....	.....	.....	.....	132	1.4
19. through 24: (other subjects)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	24	24	25	27	3,300	100.0	31	32	32	3,135	100.0	6,435	100.0	32	33	33	3,234	100.0	9,669	100.0

Sources and Notes: *Medynskii-1952*, pp. 59, 74, 86. Whole numbers refer to instruction hours during each week throughout the school year. In the fractions the numerator refers to the number of instruction hours in a given subject during the weeks of the fall term; the denominator refers to the number of instruction hours during the weeks of the spring term. The academic year consists of 33 instruction weeks. Other subjects were introduced at later dates: see Table II–B–3 and Table II–B–4. The basic data for the curricular structure were reconstructed from the Soviet primary source cited; arrangement, grouping and computed distributions are those of the author. For a description of the course contents of the individual subjects of instruction listed above, see *SPM*, pp. 275–77.

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TABLE II–B–3.—*General curriculum of Soviet primary and secondary school as of 1955*

Subjects of instruction	Primary—complete secondary (10-year) school																		
	Primary—incomplete secondary (7-year) school																		
	Primary (4-year) school																		
	Elementary grades 1–4						Intermediate grades 5–7						Upper grades 8–10						
	Instruction hours per week in grades:				Total, grades 1–4		Instruction hours per week in grades:			Total, grades 5–7		Total, grades 1–7		Instruction hours per week in grades:			Total, grades 8–10		Total, grades 1–10	
	1	2	3	4	Hours	Percent	5	6	7	Hours	Percent	Hours	Percent	8	9	10	Hours	Percent	Hours	Percent
Group I: General (languages, literatures, humanities and social sciences)	13	13	13	13	1,716	53.0	18	16	13	1,551	49.0	3,267	51.0	15/15	14	13	1,386	40.1	4,653	47.2
1. Russian language and literature	13	13	13	9	1,584	49.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2. Other literature	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
(1, 2) Total 1–2	13	13	13	9	1,584	49.0	9	8	6	759	24.0	2,343	36.6	6/5	4	4	445	12.9	2,788	28.3
3. Foreign language (German, French, English)	.....	.....	.....	.....	.....	.....	4	4	3	363	11.5	363	5.7	3	3	3	297	8.6	660	6.7
4. History	.....	.....	.....	2	66	2.0	2	2	2	198	6.2	264	4.1	4	4	4	396	11.5	660	6.7
5. Constitution of the U.S.S.R.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	33	0.9	33	0.3
6. Geography	.....	.....	.....	2	66	2.0	3	2	2	231	7.3	297	4.6	213	3	.....	182	5.3	479	4.9
7. Psychology	.....	.....	.....	..[a]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	33	0.9	33	0.3
8. Logic	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Group II: Scientific (mathematics and sciences)	6	6	6	8	858	26.5	8	10	14	1,056	33.3	1,914	29.9	13	14	15/15	1,386	40.1	3,300	33.5
9. Arithmetic	6	6	6	6	792	24.5	6	1	.....	231	7.3	1,023	16.0	.....	.....	.....	.....	.....	1,023	10.4
10. Mathematics (algebra, geometry, trigonometry)	.....	.....	.....	.....	.....	.....	.....	5	6	363	11.4	363	5.7	6	6	6	594	17.2	957	9.7
(9, 10) Total 9–10	6	6	6	6	792	24.5	6	6	6	594	18.7	1,386	21.7	6	6	6	594	17.2	1,980	20.1
11. General science (nature studies, introductory and biology)	.....	.....	.....	2	66	2.0	2	2	3	231	7.3	297	4.6	2	1	.....	99	2.9	396	4.1
12. Chemistry	.....	.....	.....	.....	.....	.....	.....	.....	2	66	2.1	66	1.0	2	3	3/4	281	8.1	347	3.5
13. Physics	.....	.....	.....	.....	.....	.....	.....	2	3	165	5.2	165	2.6	3	4	5/4	379	11.0	544	5.5
14. Astronomy	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	33	0.9	33	0.3
Group III: Applied (activity, skill and vocational arts)	5	5	5	5	660	20.5	6	6	5	561	17.7	1,221	19.1	5	5	5	683	19.8	1,904	19.3
15. Physical education (including military training for boys)	2	2	2	2	264	8.2	2	2	2	198	6.2	462	7.3	2	2	2	198	5.7	660	6.8
16. Drawing	1	1	1	1	132	4.1	1	1	.....	66	2.1	198	3.1	.....	.....	.....	.....	.....	198	2.0
17. Drafting	.....	.....	.....	.....	.....	.....	.....	.....	1	33	1.1	33	0.5	1	1	1	99	2.9	132	1.3
18. Singing	1	1	1	1	132	4.1	1	1	.....	66	2.1	198	3.1	.....	.....	.....	.....	.....	198	2.0
19. Manual labor and school work shop	1	1	1	1	132	4.1	2	2	2	198	6.2	330	5.1	.....	.....	.....	.....	.....	330	3.3
20. Obligatory excursions to production enterprises	.....	.....	.....	.....	.....	.....	a	a	a	.....	.....	.....	.....	a	a	a	188	5.5	188	1.9
21. Practical experience in industrial or agricultural production	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	2	2	198	5.7	198	2.0
22. through 24 (other subjects)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	24	24	24	26	3,234	100.0	32	32	32	3,168	100.0	6,402	100.0	33	33	33	3,455	100.0	9,857	100.0

[a] not allocated per week.

Sources and Notes: *Medynskii–1955*, pp. 60, 73, 74, 84. Whole numbers refer to instruction hours during each week throughout the school year. In the fractions the numerator refers to the number of instruction hours in a given subject during the weeks of the fall term; the denominator refers to the number of instruction hours during the weeks of the spring term. The academic year consists of 33 instruction weeks. Other subjects were introduced at later dates: see Table II–B–4. The basic data for the curricular structure were reconstructed from the Soviet primary source cited; arrangement, grouping and computed distributions are those of the author.

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SUPPLEMENT TO TABLE II–B–3

TEXTBOOKS FOR TEN-YEAR SCHOOLS IN U.S.S.R.[1]

The following listing of textbooks was prepared by the U. S. Office of Education, Division of International Relations, which has copies of a large number of these texts. The author is indebted to W. K. Medlin for providing him with this list.

GRADE I

Russian Language and Literature:

Bukvar' (Primer). Compiled by a group of co-workers in RSFSR Acad. of Pedagog. Sciences. 6th ed.

VOSKRESENSKAIA, A. I. *Bukvar'* (Primer) 15th ed.

KOSTIN, N. A. *Uchebnik russkogo iazyka. Grammatika, pravopisanie, razvitie rechi* (Textbook of Russian Language. Grammar, penmanship, speech development). For grade one. 5th ed.

SOLOV'EVA, E. E. *and others. Rodnaia rech'* (The Mother Tongue). Reader for grade one. 15th ed.

Arithmetic:

PCHELKO, A. S. *and others. Arifmetika* (Arithmetic). Textbook for grade one. 4th ed.

GRADE II

Russian Language and Literature:

KOSTIN, N. A. *idem.* For grade two. 6th ed., Uchpedgiz.

SOLOV'EVA, E. E. *and others. idem.* Reader for grade two. 15th ed.

Arithmetic:

PCHELKO, A. S. *and others. idem.* Textbook for grade two. 5th ed.

GRADE III

Russian Language and Literature:

ZAKOZHURNIKOVA, M. L. *and* ROZHDESTVENSKII, N. S. *Uchebnik russkogo iazyka* (Textbook for Russian Language). For grade three. 5th ed., Uchpedgiz.

SOLOV'EVA, E. E. *and others. idem.* Reader for grade three. 14th ed.

Arithmetic:

PCHELKO, A. S. *and others. idem.* Textbook for grade three. 4th ed.

GRADE IV

Russian Language and Literature:

ZAKOZHURNIKOVA, M. L. *and* ROZHDESTVENSKII, N. S. *idem.* For grade four. 4th ed.

SOLOV'EVA, E. E. *and others. idem.* Reader for grade four. 14th ed.

Arithmetic:

PCHELKO, A. S. *and others. idem.* Textbook for grade three. 4th ed.

Natural Science:

SKATKIN, M. N. *Kniga dlia chteniia po estestvoznaniiu* (Reader for natural science). For grade four. 4th ed.

Geography:

BLONSKAIA, N. I. *and* RAUSH, V. A. *Kniga dlia chteniia po geografii* (Reader for geography). For grade four. 4th ed.

History:

ALEKSEEV, S. P. *and others. Istoriia SSSR* (History of the U.S.S.R.) For grade four. 3d ed.

GRADE V

Russian Language and Literature:

BARKHUDAROV, S. G. *and* KRIUCHKOV, S. E. *Uchebnik russkogo iazyka* (Textbook of Russian) Part 1. *Fonetika i morfologiia* (Phonetics and morphology). For grades 5–6. 5th ed.

GOLUBKOV, V. V. *and others. Rodnaia literatura* (Native literature). Reader for grade 5. 5th ed.

USHAKOV, D. N. *and* KRIUCHKOV, S. E. *Orfograficheskii slovar'* (Orthographic dictionary). For grades 5–10. 14th ed.

Arithmetic:

SHEVCHENKO, I. N. *Arifmetika* (Arithmetic). For grades 5–6. 3d ed.

PONOMAREV, S. A. *and* SYRNEV, N. I. *Sbornik zadach i uprazhenii po arifmetike* (Manual of problems and exercises in arithmetic). For grades 5–6. 5th ed.

VSESVIATSKII, V. B. *Botanika* (Botany). For grades 5–6. 3d ed.

Geography:

ZASLAVSKII, I. I. *and* GERASIMOVA, T. P. *Fizicheskaia geografiia* (Physical geography). For grade 5. 4th ed.

History:

KOROVKIN, F. P. *Istoriia drevnego mira* (History of the ancient world). For grades 5–6. 4th ed.

Foreign languages:

TSVETKOVA, Z. M. *and* SHPIGEL, TS. G. *Uchebnik angliiskogo iazyka* (Textbook of English). For grade 5. 4th ed.

BAKHAREVA, M. A. *and* KALACHEVA, Z. V. *Uchebnik frantsuzskogo iazyka* (Textbook of French). For grade 5. 4th ed.

GRIGOR'EVA, V. M. *and others. Uchebnik nemetskogo iazyka* (Textbook of German). For grade 5. 4th ed.

Practical exercises:

KIVOTOV, S. A. *Prakticheskie zaniatiia na shkol'nom uchebno-opytnom uchastke* (Practical exercises in the school experimental gardens). Study aid for grades 5–6. 3d ed.

GRADE VI

Russian language and literature:

BARKHUDAROV, S. G. *and* KRIUCHKOV, S. E. *Uchebnik russkogo iazyka* (Textbook of Russian). Part 2. *Sintaksis* (Syntax). For grades 6–7. 5th ed.

BOCHAROV, G. K. *Rodnaia literatura* (Native literature). Reader for grade 6. 4th ed.

Mathematics:

BARSUKOV, A. N. *Algebra* (Algebra). Part 1. For grades 6–7. 3d ed.

NIKITIN, N. N. *and* FETISOVA, A. I. *Geometriia* (Geometry). Part I. For grades 6–9. 3d ed.

LARICHEV, P. A. *Sbornik zadach i uprazhnenii po algebre* (Manual of problems and exercises in algebra). For grades 6–7. 10th ed.

NIKITIN, N. N. *Sbornik zadach po geometrii* (Manual of problems in geometry). Part 1. For grades 6–7. 2d ed.

Physics:

PERYSHKIN, A. V. *and others. Fizika* (Physics). For grade 6. 10th ed.

Geography:

SCHASTNEV, P. N. *and others. Fizicheskaia geografiia chastei sveta* (Physical geography of parts of the world). For grade 6. 4th ed.

History:

KOSMINSKII, E. A. *Istoriia srednikh vekov* (History of the Middle Ages). For grades 6–7. 5th ed.

[1] List published in *Sovetskie knigi*, No. 147, 1957 (Moskva: Vsesoiuznoe ob'edinenie "Mezhdunarodnaia Kniga", 1957), pp. 41-52. All textbooks are published by the State Publishing House for Textbooks (*Uchpedgiz*).

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Foreign languages:

NELIDOV, I. A. *Uchebnik angliiskogo iazyka* (Textbook of English). For grade 6. 3d ed.

PARCHEVSKII, K. K. *and* ROISENBLIT, E. B. *Uchebnik frantsuzskogo iazyka* (Textbook of French). For grade 6. 3d ed.

KUDRIAVTSEVA, O. E., ZLATOGORSKAIA, R. L., *and* STRODT, L. M. *Uchebnik nemetskogo iazyka* (Textbook of German). For grade 6. 3d ed.

GRADE VII

Literature:

BOCHAROV, G. K. *Rodnaia literatura* (Native literature). Reader for grade 7. 4th ed.

Physics:

PERYSHKIN, A. V. *and others. Fizika* (Physics). Part 2. For grade 7. 10th ed.

Chemistry:

KIRIUSHKIN, D. M. *Khimiia* (Chemistry). For grade 7. 5th ed.

Geography:

STROEV, K. F. *Geografiia SSSR* (Geography of the U.S.S.R.). For grade 7. 2d ed.

Mechanical drawing:

ABRIKOSOV, A. A. *Cherchenie* (Mechanical drawing). Part 1. For grade 7. 6th ed.

Zoology:

SHALAEV, V. F. *and* RYKOV, N. A. *Zoologiia* (Zoology). For grade 7. 3d ed.

Foreign Languages:

BELOVA, E. V. *and* TODD, L. R. *Uchebnik angliiskogo iazyka* (Textbook of English). For grade 7. 10th ed.

LIVSHITS, E. I. *and* RONSKAIA, L. N. *Uchebnik frantsuzskogo iazyka* (Textbook of French). For grade 7. 10th ed.

IVANOV, D. B. *and others. Uchebnik nemetskogo iazyka* (Textbook of German). For grade 7. 2d ed.

Practical exercises:

KIVOTOV, S. A. *Prakticheskie zaniatiia na uchebno-opytnom uchastke* (Practical exercises in the school experimental gardens). Study aid for grade 7. 2d ed.

GRADE VIII

Russian language and literature:

GREKOV, V. F. and others. *Posobie dlia zaniatii po russkomu iazyku v starshikh klassakh (8-10 klassy)* (Aid for the study of Russian in the upper grades (Grades 8–10). 7th ed.

BRODSKII, N. L. *and* KUBIKOV, I. N. *Khrestomatiia po russkoi literature* (Reader in Russian literature). For grade 8. 21st ed.

FLORINSKII, S. M. *Russkaia literatura* (Russian literature). For grades 8–10. 5th ed.

Mathematics:

KISELEV, A. P. *Algebra* (Algebra). Part 2. For grades 8–10. 35th ed.

LARICHEV, P. A. *Sbornik zadach i uprazhnenii po algebre* (Manual of problems and exercises in algebra). For grade 8. 9th ed.

BRADIS, V. M. *Chetyrekhznachnye matematicheskie tablitsy* (Four-place mathematical tables). For grades 8–10. 29th ed.

Physics:

PERYSHKIN, A. V. *and others. Kurs fiziki* (A course in physics). Part 1. For grade 8. 5th ed.

ZNAMENSKII, P. A. *Sbornik zadach i uprazhnenii po fizike* (Manual of problems and exercises in physics). For grades 8–10. 10th ed.

Mechanical drawing:

ABRIKOSOV, A. A. *Cherchenie* (Mechanical drawing). Part 2. For grades 8–10. 4th ed.

Anatomy and physiology:

GARIB'IAN, R. B. *and others. Anatomiia i fiziologiia cheloveka* (Anatomy and physiology of man). For grade 8. 3d ed.

Chemistry:

KHODAKOV, IU. V., SHAPOVALENKO, S. I. *and others. Khimiia* (chemistry). For grades 8–10. 4th ed.

GOL'DFARB, IA. L. *and* SMORGONSKII, L. M. *Sbornik zadach i uprazhnenii po khimii* (Manual of problems and exercises in chemistry). For grades 8–10. 19th ed.

Geography:

MAMAEV, I. I. *Ekonomicheskaia geografiia zarubezhnykh stran* (Economic geography of foreign countries). For grade 8. 3d ed.

History:

EFIMOV, A. V. *Novaia istoriia* (Modern History). Part 1. For grade 8. 17th ed.

BUSHCHIK, A. P. *Istoriia SSSR* (History of the U.S.S.R.). Part 1. For grade 8. 3d ed.

Foreign languages:

BELOVA, E. V. *and* TODD, L. R. *Uchebnik angliiskogo iazyka* (Textbook of English). For grade 8. 8th ed.

GRUZINSKAIA, I. A. *and* CHERKASSKAIA, E. B. *Grammatika angliiskogo iazyka dlia starshikh klassov* (English grammar for the upper grades). Grades 8–10. 18th ed.

BAKHAREVA, M. A. *and others. Uchebnik frantsuzskogo iazyka* (Textbook of French). For grade 8. 9th ed.

SYREISHCHIKOVA, A. A. *Kratkii grammaticheskii spravochnik frantsuzskogo iazyka* (Brief French grammar manual). For grades 8–10. 14th ed.

BERGMAN, N. A. *and* GIL'KNER, A. IU. *Uchebnik nemetskogo iazyka* (Textbook of German). For grade 8. 9th ed.

BERGMAN, N. A. *and* NATANZON, M. D. *Grammatika nemetskogo iazyka* (German grammar). For grades 8–10. 9th ed.

Practical exercises:

SHCHERBAKOV, M. I. *and otthers. Praktikum po osnovam rastenievodstva i sel'skokhoziaistvennogo mashinovedeniia* (Practical training in the fundamentals of plant culture and of the operation and maintenance of agricultural machinery). For grades 8–10 of rural schools. 2d ed.

LAPIN, M. M. *Osnovy rastenievodstva* (Fundamentals of plant culture). Textbook for grade 8 of rural schools. 2d ed.

ELENEV, A. V. *and others. Osnovy mekhanizatsii sel'skogo khoziaistva* (Fundamentals of the mechanization of agriculture). Study aid for grades 8–10. 3d ed.

BESPALKO, V. P. *Rukovodstvo po mashinovedeniiu* (Handbook on the operation and maintenance of machinery). Part 1. Study aid for grade 8. 2d ed.

GRADE IX

Literature:

ZERCHANINOV, A. A. *and others. Russkaia literatura* (Russian literature). For grade 9. 17th ed.

CHERNYSHEVSKII, N. G. *Chto delat'!?* (What is to be done!?). ("Biblioteka shkol'nika"). Study aid for grade 9.

GONCHAROV, I. A. *Oblomov.* ("Biblioteka shkol'nika"). Study aid for grade 9.

OSTROVSKII, A. N. *Groza* (The storm). ("Biblioteka shkol'nika"). Study aid for grade 9.

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CHEKHOV, A. P. *Vishnevyi sad* (The cherry orchard). *Rasskazy* (Short stories). ("Biblioteka shkol'nika"). Study aid for grade 9.
TOLSTOI, L. N. *Voina i mir* (War and peace). Vols. I and II. ("Biblioteka shkol'nika"). Study aid for grade 9.
TOLSTOI, L. N. *Voina i mir (Idem.)* Vols. III and IV. ("Biblioteka shkol'nika"). Study aid for grade 9.

Mathematics:

KISELEV, A. P. *Geometriia* (Geometry). Part 2. For grades 9–10. 20th ed.
RYBKIN, N. A. *Sbornik zadach po geometrii* (Manual of problems in geometry). Part 2. For grades 9–10. 25th ed.
NOVOSELOV, S. I. *Trigonometriia* (Trigonometry). For grades 9–10. 3d ed.
STRATILATOV, P. V. *Sbornik zadach po trigonometrii* (Manual of problems in trigonometry). For grades 9–10. 2d ed.

Physics:

PERYSHKIN, A. V. *and others. Kurs fiziki* (A course in physics). Part 2. For grades 9–10. 5th ed.

Biology:

VESELOV, E. A. *Osnovy obshchei biologii* (Fundamentals of general biology). For grade 9. 2d ed.

Geography:

LIALIKOV, N. I. *Ekonomicheskaia geografiia SSSR* (Economic geography of the U.S.S.R). For grade 9. 2d ed.

History:

GALKIN, I. S., KHVOSTOV, V. M. *and others. Novaia istoriia* (Modern history). Part 2. For grade 9. 13th ed.
Istoriia SSSR (History of the U.S.S.R.). Part 2. Under the editorship of PAMKRATOVA, A. M. For grade 9. 17th ed.

Foreign languages:

BELOVA, E. V. *and* TODD, L. R. *Uchebnik angliiskogo iazyka* (Textbook of English.) For grade 9. 8th ed.
BAKHAREVA, M. A. *and* TSETLIN, N. T. *Uchebnik frantsuzskogo iazyka* (Textbook of French). For grade 9. 8th ed.
POLOGILOV, K. M. *Uchebnik nemetskogo iazyka* (Textbook of German). For grade 9. 8th ed.

Practical exercises:

ESAULOV, P. A. *and others. Osnovy zhivotnovodstva* (Fundamentals of animal husbandry). Study aid for grade 9 of rural schools. 3d ed.
STAVROVSKII, A. E. *Praktikum po osnovam zhivotnovodstva* (Practical training in the fundamentals of animal husbandry). Handbook for grade 9 of rural schools. 3d ed.
BESPALKO, V. P. *Rukovodstvo po mashinovedeniiu* (Handbook on the operation and maintenance of machinery). Part 2. *Avtomobil'* (The automobile). Study aid for grade 9. 2d ed.
SHANTYR', M. V. *Rukovodstvo po mashinovedeniiu* (Handbook on the operation and maintenance of machinery). (*Traktor*) (Tractor). Study aid for grade 9. 2d ed.

GRADE X

Literature:

DEMENT'EV, A. G. *and others. Russkaia sovetskaia literatura* (Russian Soviet literature). For grade 10. 7th ed.
GOR'KII, M. *V. I. Lenin, Mat', Na dne, Starukha Izergil'* (V. I. Lenin, Mother, In the depths, Old woman Izergil'). ("Biblioteka shkol'nika").
MAIAKOVSKII, V. *Stikhi i poemy* (Verses and poems). 3d ed., ("Biblioteka shkol'nika").
OSTROVSKII, N. *Kak zakalialas' stal'* (How the steel was tempered). ("Biblioteka shkol'nika").
FADEEV, A. *Molodaia gvardiia* (The young guard). ("Biblioteka shkol'nika").
SHOLOKHOV, M. *Podniataia tselina* (The Virgin Soil Upturned). Novel. Book I. 3d ed., ("Biblioteka shkol'nika").
Literatura narodov SSSR (Literature of the peoples of the U.S.S.R.). Sbornik. (An anthology). Compiled by KLIMOVICH, L. I. For grade 10. 5th ed.

Physics:

PERYSHKIN, A. V. *and others. Kurs fiziki* (A course in physics). Part 3. For grade 10. 5th ed.

Astronomy:

VORONTSOV-VEL'IAMINOV, B. A. *Astronomiia* (Astronomy). For grade 10. 5th ed.

History:

Istoriia SSSR (History of the U.S.S.R.). Part 3. Under the editorship of PANKRATOVA, M. A. For grade 10. 17th ed.

Foreign Languages:

NELIDOVA, I. A. *and* TODD, L. R. *Uchebnik angliiskogo iazyka* (Textbook of English). For grade 10. 7th ed.
LOBANOVA, L. G. *and others. Uchebnik frantsuzskogo iazyka* (Textbook of French). For grade 10. 7th ed.
POGODILOV, K. M. *and* RAKHMANOV, I. V. *Uchebnik nemetskogo iazyka* (Textbook of German). For grade 10. 18th ed.

Practical exercises:

MEMRUK, A. F. *Praktikum po elektrotekhnike* (Practical training in electrical engineering). For grade 10. 2d ed.

Note: With the exception of textbooks for the new subjects introduced in the curriculum in 1955–57, these textbooks were used with the 1952, 1955 and 1957 curricula presented in this appendix.

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TABLE II–B–4.—*General curriculum of Soviet primary and secondary school as of 1957*

Subjects of instruction	Primary—complete secondary (10-year) school																		
	Primary—incomplete secondary (7-year) school																		
	Primary (4-year) school						Intermediate grades 5–7						Upper grades 8–10						
	Elementary grades 1–4																		
	Instruction hours per week in grades:				Total, grades 1–4		Instruction hours per week in grades:			Total, grades 5–7		Total, grades 1–7		Instruction hours per week in grades:			Total, grades 8–10		Total grades 1–10	
	1	2	3	4	Hours	Percent	5	6	7	Hours	Percent	Hours	Percent	8	9	10	Hours	Percent	Hours	Percent
Group I: General (languages, literatures, humanities and social science)	13	13	13	14	1,768	52.0	18	16	13	1,598	47.5	3,366	49.7	14/14	13/14	11/12	1,326	34.4	4,692	44.2
1. Russian language and literature	13	13	13	9	1,632	48.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2. Other literature	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total 1-2	13	13	13	9	1,632	48.0	9	8	6	782	23.2	2,414	35.7	5	4	4	442	11.5	2,856	26.9
3. Foreign language (German, French, English)	.....	.....	.....	.....	.....	.....	4	4	3	374	11.1	374	5.5	3	3	3	306	7.9	680	6.5
4. History	.....	.....	.....	2	68	2.0	2	2	2	204	6.1	272	4.0	4/3	3/4	4/5	391	10.1	663	6.2
5. Constitution of the U.S.S.R.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6. Geography	.....	.....	.....	2	68	2.0	3	2	2	238	7.1	306	4.5	2/3	4	.....	187	4.9	493	4.6
7. Psychology	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8. Logic	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Group II: Scientific (mathematics and sciences)	6	6	6	8	884	26.0	8	11	3	1,088	32.3	1,972	29.2	13	13/12	14/13	1,360	35.4	3,332	31.4
9. Arithmetic	6	6	6	6	816	24.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
10. Mathematics (algebra, geometry, trigonometry)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total 9–10	6	6	6	6	816	24.0	6	6	6	612	18.2	1,428	21.2	6	6	6/5	595	15.5	2,023	19.2
11. General science (nature studies, introductory and biology)	.....	.....	.....	2	68	2.0	2	3	2	238	7.1	306	4.5	2	1	.....	102	2.6	408	3.8
12. Chemistry	.....	.....	.....	.....	.....	.....	.....	.....	2	68	2.0	68	1.0	2	2	4	272	7.1	340	3.2
13. Physics	.....	.....	.....	.....	.....	.....	.....	2	3	170	5.0	170	2.5	3	4/3	4	357	9.3	527	4.9
14. Astronomy	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	34	0.9	34	0.3
Group III: Applied (activity, skill and vocational arts)	5	5	6	6	748	22.0	6	6	6	680	20.2	1,428	21.1	7	8	8	1,165	30.2	2,593	24.4
15. Physical education (including military training for boys)	2	2	2	2	272	8.0	2	2	2	204	6.1	476	7.1	3	3	3	306	7.9	782	7.5
16. Drawing	1	1	1	1	136	4.0	1	1	.....	68	2.0	204	3.0	.....	.....	.....	.....	.....	204	1.9
17. Drafting	.....	.....	.....	.....	.....	.....	.....	.....	1	34	1.0	34	0.5	1	1	1	102	2.6	136	1.3
18. Singing	1	1	1	1	136	4.0	1	1	.....	68	2.0	204	3.0	.....	.....	.....	.....	.....	204	1.9
19. Manual labor and school work shop	1	1	2	2	204	6.0	2	2	2	204	6.1	408	6.0	.....	.....	.....	.....	.....	408	3.8
20. Obligatory excursions to enterprises	.....	.....	.....	.....	.....	.....	(c)	(c)	(c)	.....	.....	.....	.....	(c)	(c)	(c)	191	5.0	191	1.7
21. Practical experience in industrial or agricultural production	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
22. Fall and spring field work and industrial work after school	.....	.....	.....	.....	.....	.....	(a)	(a)	(a)	b102	3.0	102	1.5	.....	.....	.....	.....	.....	102	1.0
23. Fundamentals of production (course)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	4	4	374	9.7	374	3.6
24. Practical work (summer employment after the end of the school year)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	(d)	(d)	.....	192	5.0	192	1.7
Total	24	24	25	27	3,400	100.0	32	32	32	3,366	100.0	6,766	100.0	34	34	34	3,851	100.0	10,617	100.0
25. Supplemental optional vocational electives	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2	2	170	.....	170	.....
Grand total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	35	36	36	4,021	.....	10,787	.....

a, b, c, d—see discussion in notes below.

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SOURCES AND NOTES TO TABLE II–B–4

Curricular data from *APS–NarObr–1957*, pp. 93–95; *U.S.S.R.* (English, U.S. ed.), 1958, No. 10 (Issue 25), p. 2. The basic data for the curricular structure were reconstructed from the Soviet primary sources cited; arrangement, grouping and computed distributions are those of the author. The Soviet data apparently contain a printing error concerning the distribution of geography hours in the 4th and 5th grades, which was corrected by the author.

The academic year is based on 34 instruction weeks in grades 1, 2, 3 and 10; in grades 4 through 9 the academic year is 35 weeks in length, of which one week (six school days) is allocated to excursions (footnote "c" in the table). The academic year of 34 or 35 weeks constitutes an increase over the 33–week school year, which had been common for 25 years prior to 1957.

a.—Fall and spring field work and industrial work after school are conducted in grades 5–7 and the time allocated thereto is 22 instruction hours in each grade. This is supplemented, however, in urban schools by 6 work days, and in rural schools by 12 work days of 3 hours' duration each, after the completion of the 5th and 6th grades. The latter time must be spent on "experimental school plots" (i.e., vegetable and flower gardens, fruit orchards). The total time thus spent is as indicated in footnote "b."

b.—The curricular time allocated to work experience activities in urban schools is 102 hours (grade 5: 22 plus 18; grade 6: 22 plus 18; grade 7: 22). In rural schools it is 138 hours (grades 5: 22 plus 36; grade 6: 22 plus 36; grade 7: 22).

c.—The time allocated to the course "Practical experience in industrial or agricultural production" is absorbed in this version of the curriculum for grades 5–7 in Item 22, "Fall and spring field work," and for grades 8 and 9, in Item 24, "Practical work."

d.—Practical work (summer employment) is required in grades 8 and 9, for a total time of 192 hours. It consists of excursions, labor and employment activities, which are not subject to weekly scheduling and thus cannot be spaced in the curriculum with regularity as to their timing. Among the optional electives is included driver (car or tractor) education, with 10 hours of individual instruction. All these vocational skill activities are incorporated into the regular curriculum as part of its conversion to polytechnical instruction (see discussion in text).

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TABLE II–B–5.—*General curriculum of Soviet primary and secondary school introduced in 1959*

Subjects of instruction	Primary—complete secondary (11-year) school																			
	8-year general education (primary—junior secondary) school													Secondary labor-polytechnical school						
	Elementary grades 1–4						Intermediate grades 5–8							Upper grades 9–11						
	Instruction hours per week in grades:				Total, grades 1–4		Instruction hours per week in grades:				Total, grades 5–8		Total, grades 1–8		Instruction hours per week in grades:			Total, grades 9–11		Total, grades 1–11	
	1	2	3	4	Hours	Percent	5	6	7	8	Hours	Percent	Hours	Percent	9	10	11	Hours	Percent	Hours	Percent
Group I: General (languages, literatures, humanities and social sciences)	12	12	12	12	1,728	46.6	16	15	12	13	2,003	41.5	3,731	43.7	7	10	14	1,153	26.8	4,884	38.0
1. Russian language and literature	12	12	12	10	1,656	44.6	6	5	3	2	574	11.9	2,230	26.1	.....	.....	.....	.....	.....	2,230	17.4
2. Other literature	.....	.....	.....	.....	.....	.....	2	3	2	3	357	7.4	357	4.2	3	3	3	339	7.9	696	5.4
Total 1–2	12	12	12	10	1,656	44.6	8	8	5	5	931	19.3	2,587	30.3	3	3	3	339	7.9	2,926	22.8
3. Foreign language (German, French, English)	.....	.....	.....	.....	.....	.....	4	3	3	3	465	9.6	465	5.5	2	2	3	261	6.1	726	5.6
4. History (and)	.....	.....	.....	2	72	2.0	2	2	2	3	321	6.7	393	4.6	2	3	4	335	7.8	728	5.7
5. Constitution of the U.S.S.R.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	70	1.6	70	0.5
6. Geography	.....	.....	.....	.....	.....	.....	2	2	2	2	286	5.9	286	3.3	.....	2	2	148	3.4	434	3.4
7. Psychology	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8. Logic	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Group II: Scientific (mathematics and sciences)	6	6	6	9	972	26.3	8	10	12	12	1,500	31.0	2,472	29.0	13	12	8	1,255	29.2	3,727	29.1
9. Arithmetic	6	6	6	6	864	23.3	.....	.....	.....	.....	.....	.....	864	10.1	.....	.....	.....	.....	.....	864	6.8
10. Mathematics (algebra, geometry, trigonometry)	.....	.....	.....	.....	.....	.....	6	6	6	5	823	17.0	823	9.7	4	4	4	452	10.5	1,275	9.9
Total 9–10	6	6	6	6	864	23.3	6	6	6	5	823	17.0	1,687	19.8	4	4	4	452	10.5	2,139	16.7
11. General science (nature studies, introductory and biology)	.....	.....	.....	3	108	3.0	2	2	2	2	286	5.9	394	4.6	3	.....	.....	117	2.7	511	4.0
12. Chemistry	.....	.....	.....	.....	.....	.....	.....	.....	2	2	142	2.9	142	1.7	2	3	2	265	6.2	407	3.2
13. Physics	.....	.....	.....	.....	.....	.....	.....	2	2	3	249	5.1	249	2.9	4	4	2	382	8.9	631	4.9
14. Astronomy	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	39	0.9	39	0.3
Group III: Applied (activity, skill and vocational arts)	6	6	8	8	1,008	27.1	9	9	10	9	1,323	27.5	2,331	27.3	18	16	16	1,886	44.0	4,217	32.9
15. Physical education (including military training for boys)	2	2	2	2	288	7.8	2	2	2	2	286	5.9	574	6.7	2	2	2	226	5.3	800	6.2
16. Drawing	1	1	1	1	144	3.8	1	1	1	.....	108	2.2	252	3.0	2	.....	.....	78	1.8	330	2.6
17. Drafting	.....	.....	.....	.....	.....	.....	.....	.....	1	1	71	1.5	71	0.8	.....	.....	.....	.....	.....	71	0.6
18. Singing and music	1	1	1	1	144	3.9	1	1	1	1	143	2.9	287	3.3	.....	.....	.....	.....	.....	287	2.2
19. Manual labor & school workshop	2	2	2	2	288	7.8	3	3	3	3	429	9.1	717	8.4	[a]12	[a]12	[a]12	[a]1356	31.6	[a]2073	16.2
20 Obligatory excursions to production enterprises	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
21. Practical experience in industrial or agricultural production	.....	.....	2	2	144	3.9	2	2	2	2	286	5.9	430	5.1	(a)	(a)	(a)	(a)	.....	[a]430	3.3
22. Fall and spring field work and industrial work after school	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
23. Fundamentals of production (course)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	(a)	(a)	(a)	(a)	.....	(a)	.....
24. Practical work (summer employment at end of school year)	.....	.....	.....	.....	.....	.....	Two weeks annually				.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
25. Supplemental optional vocational electives	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	2	2	226	5.3	226	1.8
Grand Total	24	24	26	29	3,708	100.0	33	34	34	34	4,826	100.0	8,534	100.0	38	38	38	4,294	100.0	12828	100.0
School weeks	36	36	36	36	.....	.....	36/38	36/38	36/38	35/39	.....	.....	.....	.....	39/39	39/39	35/39	.....	.....	.....	.....

[a] Combined allocation of hours included under manual labor & school workshop category.

Sources: *Uchitel'skaia gazeta*, Aug. 31, 1959; verified in MP RSFSR, *Programmy*....., Moscow, 1959, *passim*. In the number of school weeks the numerator indicates the actual number of classroom instruction weeks; the denominator, the total number of school weeks in the year, including those for industrial practice and final examinations.

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TABLE II–C–1.—*Graduations in the U.S.S.R. from the 10th grade of the complete secondary school or its equivalent, 1927–60, and 1965 projection*

Year	All types of schools		Regular secondary schools	
	Fall enrollment in grade 10 and equivalent	Graduates	Fall enrollment in grade 10 and equivalent	Graduates
	A	B	C	D
1927....	99,000	..	50,000	..
1928....	..	78,000	..	45,000
1933....	..	..	32	none.
1934....	..	..	22,647	negl.
1935....	..	..	51,492	18,000
1936....	..	..	..	42,000
1937....	..	..	..	112,000
1938....	..	..	..	155,000
1939....	..	..	..	232,000
1940....	475,000	..	450,000	285,000
1941....	..	..	..	422,000
1946....	..	137,000	..	127,000
1947....	..	..	..	164,000
1948....	..	..	..	..
1949....	..	..	..	..
1950....	388,000	242,000	290,000	220,000
1951....	..	..	..	260,000
1952....	..	352,000	..	315,000
1953....	..	506,000	880,000	440,000
1954....	1,328,000	939,000	1,100,000	818,000
1955....	1,560,000	1,157,000	1,300,000	1,006,000
1956....	1,609,000	1,368,000	1,300,000	1,190,000
1957....	..	1,500,000	..	1,270,000
1958....	..	1,600,000	..	1,340,000
1959....	..	1,400,000	..	1,100,000
1960....	..	1,000,000	..	700,000
1965.... anticipated	..	(2,030,000)	..	..

SOURCES AND NOTES TO TABLE II–C–1

Year of reference — Source and discussion

1927, 1940, 1950, 1954, 1955, 1956 A, C.—Appendix Table II–A–1 above. (Most figures are from: *NKh–1956*, pp. 224, 225; *NKh–1957*, pp. 246,248).

1928B, D.—Derived on the basis of 1927 enrollment by assuming that 1928 graduating class had a success rate of 80 and 90 percent, respectively, for B. and D.

1929–33, Note.—Not on table. From 1930 to 1933 there were *no* graduates of 10-year schools, for the reorganization of the school system interrupted the flow for about four years. In 1929 the number of graduates was probably about 60,000.

1933, 1934, 1935C, 1933–38D.—Graduations for the respective years are estimated as follows. *Kul't Stroi–1935*, p. 17, gives the following figures:

Year end	Grade	Enrollment	Graduating Class
1933	10	32	1934
1934	10	22,647	1935
1935	10	51,492	1936
1935	9	137,022	1937
1935	8	302,641	1938

Applying the annual success rates of students (given in *Kul't Stroi–1940*, p. 78; see also text, ch. II) to these classes, we obtain estimates as follows:

Year	Graduations (rounded)
1934	negligible
1935	18,000
1936	42,000
1937	112,000
1938	155,000

1939D.—Actual figure. *Pravda*, June 25, 1940, states that the anticipated graduations (317,000) in 1940 would be 85,000 over actual graduations in 1939. Therefore graduations in 1939 were 232,000. This is consistent with the figure of anticipated graduations for 1939 of 262,000 reported in *Pravda*, July 7, 1939, since the success rate in 1938 (*Kul't Stroi–1940*, p. 78) was about 90 percent in grade 10.

1940D.—*Pravda*, June 25, 1940, states that anticipated graduations in 1940 would be 317,000. Assuming the success rate of students in the last (10th) grade as 90 percent, we obtain the estimate of actual graduations as about 285,000.

1941D.—*Plan 1941*, p. 612. The figure refers to planned graduations. Actual graduations, judging from the fall 1940 enrollment, were probably not significantly different. The 1941 figure is introduced here to illustrate the highest prewar target, which apparently was not reached again until 1953.

1946, 1947 D.—Estimated as follows: *Pravda*, May 16, 1947, states that actual graduations in 1946 in the RSFSR were "more than 70,000" and that anticipated graduations in 1947 were "about 90,000." Assuming the RSFSR's share as 55 percent of the U.S.S.R.'s total graduations, we obtain for 1946 and 1947 estimates of 127,000 and 164,000 respectively.

1946B.—Derived by adding to the number of regular 10-year-school graduates 10,000 graduates of schools for working and rural youth as reported in *Medynskii–1955*, p. 114.

1950D.—Estimated as follows: *Pravda*, Aug. 6, 1953 (Zverev, 1953 budget), reports that graduations in 1953 were twice those of 1950. Assuming the figure of 440,000 for 1953 (see derivation below), we obtain the figure (220,000) stated in the table.

1950B.—Derived on the assumption that graduates of schools for working and rural youth account for an additional 10 percent over and above regular 10-year-school graduates.

1951D.—Estimated as follows: 10th-grade enrollment in the fall of 1950 was 290,000 (*NKh–1956*, p. 224.) *KS–1956*, pp. 172–73, gives a retention rate (i.e., the percentage of those who are enrolled in the respective grade at the *end* of the academic year as compared with those who started the year) of 97.0. The same source reveals the graduation (promotion) rate (i.e., percentage of those who graduate or are promoted from among those who were *enrolled* at the end of the academic year) for 1950–51 as 92.7. Applying these rates to the 1950 enrollment in grade 10, we obtain a 1951 graduating class of 260,000.

1952D.—Estimated as follows: *Pravda*, Jan. 31, 1954 (Gosplan, Itogi 1953), states that actual graduations in 1953 were 40 percent over those of 1952. Assuming 1953 graduations as 440,000 (see below), we obtain the figure of 315,000 (rounded) for 1952.

1952B.—Derived by adding to the number of regular 10-year-school graduates 37,300 graduates of schools for working and rural youth as reported in *Medynskii–1955*, p. 114.

1953C.—*Pravda*, June 19, 1954, states that about 880,000 of the 10th graders were preparing to take examinations for graduation. This figure was viewed as enrollment in the 10th grade in the academic year 1953–54.

1953D.—Estimated as follows: *Pravda*, Apr. 22, 1954 (Zverev, 1954 budget), states that anticipated graduations in 1954 were two-fold higher than actual graduations in 1953. *Pravda*, June 19, 1954, reports that about 880,000 students were preparing to take examinations in the 10th grade. Consequently the actual graduations in 1953 were about 440,000.

A check for this figure is available. *Izvestia*, May 20, 1954, states that anticipated graduations for the RSFSR in 1954 were about 470,000. The same source also states that between 1953 and 1954 graduations were to increase about 2-fold. Consequently 1953 RSFSR graduations were

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about 235,000 and since we know also the anticipated graduations for the U.S.S.R. and the RSFSR's share is about 53.4 percent of the U.S.S.R.'s total anticipated graduations, then the U.S.S.R.'s total graduations were about 435,000.

These estimates, however, are somewhat different from another figure which can be derived as follows. According to the results of the 1954 annual plan (*Vestnik statistiki*, 1955, No. 1, p. 15), the 1954 graduating class was 176 percent of 1953's. Assuming the 1954 class as 818,000, we obtain 465,000 for the 1953 graduating class. This difference (about 6 percent) between the two types of estimates is important. If we assume for 1953 a graduating class of 440,000 as being the correct figure, we derive for the subsequent years (on the basis of statements presented below) a series of graduating classes as follows:

1953	440,000	
1954	775,000	(176% of 1953)
1955	953,000	(123% of 1954)
1956	1,115,000	(117% of 1955)

All these figures are lower than the estimates presented in the table which were derived below with many cross-checks. It is the opinion of the author that the estimates presented in the table are more reliable than those derived from an assumed base of 440,000 10th-grade graduates in 1953. For 1953 proper, however, this figure (440,000) was retained.

1954D.—Estimates for the 1954 graduating class can be derived in several ways. The results of the 1955 annual plan (*Pravda*, Jan. 31, 1956) reveal that the number of graduates from the 10th grade in 1955 was 123 percent of 1954. Assuming the 1955 graduating class as 1,006,000, we obtain for 1954 an estimate of 818,000. Almost an identical estimate can be derived as follows: Assuming retention and graduation rates for the year 1953–54 of 97.0 and 95.5 percent respectively (*KS–1956*, pp. 172–73), and applying these rates to the assumed enrollment in 1953 of 880,000, we obtain a graduating class of 815,000 for 1954.

1955D.—Estimated as follows: *NKh–1956*, p. 224, reveals that 1954 fall enrollment in grade 10 to be 1,100,000. Adopting retention and success rates of 97.0 and 92.7 percent respectively (*KS–1956*, pp. 172–73) and applying them to the enrollment figure, we obtain an estimate for the 1955 graduating class of 1,006,000. A check on this figure is as follows: In the results of the 1956 annual plan (*Izvestia*, Jan. 31, 1957), it was stated that 10th-grade graduates in 1956 comprised 117 percent of 1955 graduates. Assuming for 1956 1,190,000, we obtain for 1955 a graduating class of 1,017,000, which differs from the other estimates by 1 percent.

1953–1956B.—Estimated on the assumption that schools for working and rural youth accounted for 15 percent of graduates (maturity certificate holders), in addition to those coming from regular schools. This assumption is made on the basis of *actual* ratio for 1957 and 1958.

1956D.—Estimated as follows: *NKh–1956*, p. 224, reports enrollment in grade 10 in the fall of 1955 as 1,300,000. Adopting retention and success rates for 1954 of 95.8 and 95.5 percent respectively, we obtain an estimate of 1,189,000 graduates in 1956. An alternative way for obtaining approximately the same estimate is to apply the rate of increase of 10th-grade graduates for the RSFSR. *Sovetskaia Rosiia*, Aug. 3, 1957, states that 1957 graduations were 106 percent of 1956. Adopting for 1957 the figure of 1,270,000 graduates, we obtain a 1956 total of 1,192,000.

1957B.—*Pravda*, July 20, 1957; Jan. 27, 1958.

1957D.—*Pravda*, Dec. 20, 1957. The figure refers explicitly to actual graduates from the 10th grade of regular 10-year schools.

1958B.—*Pravda*, July 24, 1958.

1958D.—*Pravda*, Dec. 20, 1957 (refers to *anticipated* graduates from the 10th grade of 10-year schools).

1959B, D.—*Pravda*, July 14, 1959, reveals the total number of secondary school graduates as 1,400,000, of whom it is assumed on the basis of the prevailing trend that 300,000 were from working and rural youth schools and 1,100,000 were regular 10th grade graduates.

Note to 1957–59.—*NarKhoz–1959*, pp. 814–15, fails to report enrollment in the 10th grade, as has been done in all similar tables in recent Soviet statistical handbooks. This omission is obviously due to the severe setback in upper-grade enrollment.

1960B, D.—*Pravda*, July 13, 1960, reveals the total number of secondary school graduates as 1 million. The number of graduates from regular secondary schools is assumed to have been 700,000 on the basis of the prevailing enrollment trends. This estimate is confirmed by *Pravda*, Jan. 26, 1961 (Itogi 1960), which states that the total number of graduates was 1,000,000, of whom 300,000 were graduates of schools for working and rural youth and schools for adults.

1965B.—*Izvestia*, Dec. 14, 1958, states that the number of secondary school graduates in 1965 will be 128 percent of the 1958 figure, which gives an estimate for 1965 of approximately 2,030,000. This is an anticipated figure for graduates of the 11-year school with production training as well as of alternating shift schools, and its realization will depend upon the enrollment in the 9th grade in 1962.

TABLE II–D–1.—*Total number of teachers in Soviet primary and secondary schools, 1914, 1922–59*

Year end	All types of primary and secondary education	Regular primary and secondary schools	
		Total	Full-time only
	A	B	C
1914a	231,000	231,000	.....
1914b	280,000	280,000	.....
1922	.....	222,974	.....
1923	.....	244,004	.....
1924	.....	251,634	.....
1925	.....	281,057	.....
1926	.....	305,412	.....
1927	349,000	346,493	.....
1928	.....	365,056	.....
1929	.....	394,848	.....
1930	.....	481,286	479,839
1931	.....	572,860	.....
1932	.....	614,922	.....
1933	.....	667,453	655,696
1934	.....	709,803	.....
1935	.....	757,044	.....
1936	.....	858,845	.....
1937	.....	913,524	.....
1938	.....	1,027,164	.....
1939	.....	1,117,058	.....
1940	1,238,000	1,215,967	.....
1945	1,056,000	1,042,813	.....
1946	.....	1,117,223	.....
1947	.....	1,187,715	.....
1948	.....	1,262,300	.....
1949	.....	1,350,265	.....
1950	1,475,000	1,433,402	1,425,312
1951	.....	1,495,332	.....
1952	.....	1,530,751	.....
1953	1,641,000	1,577,082	.....
1954	.....	1,620,115	.....
1955	1,733,000	1,655,164	1,624,558
1956	1,811,000	1,728,000	.....
1957	1,859,000	1,774,000	1,722,000
1958	1,900,000	1,813,000	1,758,000
1959	1,952,000	1,854,000	1,807,000

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SOURCES AND NOTES TO TABLE II–D–1

Place in table — *Source and discussion*

A 1914a, b, 1927, 1940, 1950, 1955, 1956.—NKh–1957, p. 244. 1914a refers to the pre-1939 boundaries of the U.S.S.R.

Note to A, B, 1949, 1950.—In the original study it was pointed out that starting in 1948 Soviet authorities changed the definition in reporting teachers. This manipulation is now definitely confirmed by examining the new statistical series. *SPM*, p. 278, gave estimates of teachers for 1949 and 1950 as follows:

	A	*B*
1949	1,520,000	1,370,000
1950	1,600,000	1,450,000

In addition to regular primary and secondary school teachers the figures in Column A included technicum and vocational school teachers as well.

A 1940, 1945, 1955, 1956.—Dos–1957, p. 274. The figures are identical with those given in *NKh–1957*, p. 244.

A 1957.—SSSR–Tsif–1958, p. 351.

A 1958.—NarKhoz–1959, p. 808–09. This source also repeats earlier figures in col. A.

B 1914a, 1922–55.—KS–1956, pp. 80–81. For the years B 1914a, 1922–38, 1939, the data in *Kul't Stroi–1940*, pp. 37, 86, 246, are identical with those presented in this table. 1914a refers to the pre-1939 boundaries of the U.S.S.R.

B 1914b.—Dos–1957, p. 274. This refers to teachers in schools within contemporary boundaries of the U.S.S.R.

C 1930, 1933.—Kul't Stroi–1935, p. 20.

C 1950, 1955.—KS–1956, pp. 178–79.

B 1956, 1957, 1958.—NarKhoz–1959, p. 812–13.

C 1957, 1958—NarKhoz–1959, p. 818.

A 1959.—NarKhoz–1960, p. 729.

B 1959.—NarKhoz–1960, p. 729.

C 1959.—NarKhoz–1960, p. 733.

TABLE II–D–2.—*Distribution of Soviet primary and secondary school teachers by grade level, urban-rural employment, sex, education and experience in 1955–56*

Category of teachers and teachers with administrative functions		Full-time teachers only	Distribution in per cent of total	Distribution of teachers in percent							
				Percent of Females	By education					By job experience	
					With higher education	With teacher institute education	Total with secondary education	Among which with secondary pedagog.	Without secondary education	Less than 5 years	25 years or more
Teachers by Grade:											
Grades 1–4	T	446,702	27.5	86.4	1.0	3.3	93.6	(86.7)	2.1	18.3	10.1
	U	163,101	10.0	95.3	2.1	4.7	92.3	(87.3)	0.9	15.5	15.7
	R	283,601	17.5	81.4	0.3	2.5	94.4	(86.4)	2.8	19.9	6.8
Grades 5–7	T	556,765	34.3	74.4	17.3	53.6	28.6	(22.1)	0.5	29.3	6.9
	U	171,529	10.6	83.2	33.1	52.7	13.9	(10.8)	0.3	25.9	11.7
	R	385,236	23.7	70.5	10.3	54.0	35.2	(27.2)	0.5	30.8	4.8
Grades 8–10	T	267,090	16.4	69.9	77.4	18.8	3.7	(2.4)	0.1	34.6	9.6
	U	145,889	9.0	75.5	85.1	12.6	2.2	(1.4)	0.1	30.1	12.9
	R	121,201	7.4	63.2	68.3	26.1	5.5	(3.5)	0.1	40.0	5.7
Total, gr. 1–10	T	1,270,557	78.2								
	U	480,519	29.6								
	R	790,038	48.6								
Special Teachers[a]		101,369	6.2	29.5	9.7	6.7	66.3	(41.3)	17.3	43.0	2.9
Total, no administrative functions		1,371,926	84.4								
Teachers with administrative functions:[b]											
Dir. & TS, 4-yr. sc.		108,582	6.7	69.4	0.3	2.4	94.3	(87.3)	3.0	10.0	10.0
Dir., 7-yr. schools		58,629	3.6	22.5	19.4	63.2	17.2	(14.1)	0.2	12.1	8.6
TS, 7-yr. schools		25,982	1.6	50.2	20.2	63.9	15.8	(12.6)	0.1	19.2	6.7
Dir., 10-yr. schools		26,791	1.7	21.3	85.4	13.3	1.3	(1.0)	0.0	10.2	17.9
TS, 10-yr. schools		32,648	2.0	52.0	73.2	21.2	5.6	(4.7)	0.0	14.4	13.7
Total with administrative functions		252,632	15.6								
Grand total[c]		1,624,558	100.0	70.3	23.5	26.9	47.6	(41.0)	2.0	25.3	8.5

T—Total. U—Urban. R—Rural.

[a] Music, singing, drawing, drafting, physical education.

[b] Directors (Dir.) and teaching supervisors (TS) in the respective schools.

[c] This grand total excludes those in "auxiliary" (?) schools, schools for the physically handicapped, schools for rural and working youth and for adults. If these categories are included, the total would be 1,733,000.

Source: *KS–1956*, 178–79.

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TABLE II–D–3.—*Distribution of Soviet primary and secondary school teachers by grade level, sex, education and experience in 1958–59*

Category of teachers and teaching personnel with administrative functions	Full-time teachers only (thous.)	Distribution in percent of total	Distribution of teachers in percent							
			Percent of females	By education					By job experience	
				With higher education	With teacher institute education	Total with secondary education	Among which with secondary pedagog.	Without secondary education	Less than 5 years	25 years or more
Teachers by Grade:										
Grades 1–4	590	33.6	87.4	2.6	6.0	90.6	85.6	0.8	21.2	8.8
Grades 5–7	508	28.9	74.8	34.0	52.0	13.9	10.4	0.1	19.0	6.6
Grades 8–10 (or 11)	246	14.0	68.2	84.7	13.5	1.8	1.2	0.0	26.6	8.2
Special Teachers[a]	151	8.6	26.5	14.1	8.5	63.4	39.0	14.0	41.2	2.9
Total teachers with no admin. function	1,495	85.1	.....	.....	.....	.....	.....	.....	.....	.....
Teaching personnel with admin. functions:[b]										
Dir. & TS, 4-yr. schools	112	6.4	98.7	1.0	4.7	93.0	88.5	1.3	12.4	12.1
Dir., 7-yr. schools	55	3.1	21.8	36.3	56.2	7.4	6.1	0.1	7.1	11.4
TS, 7-yr. schools	28	1.5	53.5	35.7	57.5	6.8	5.7	0.0	12.5	6.4
Dir., 10-yr. schools	31	1.8	19.3	91.3	8.3	0.4	0.3	0.0	5.7	21.5
TS, 10-yr. schools	37	2.1	51.3	83.2	13.5	3.3	2.8	0.0	9.7	13.5
Total with administrative functions	263	14.9								
Grand total	1,758	100.0	70.1	28.9	23.1	46.4	41.3	1.6	21.4	8.1

[a] Music, singing, drafting, physical education.
[b] Directors (Dir.) and teaching supervisors (TS) in the respective schools.

Source: *NarKhoz–1959*, pp. 818, 820.

TABLE II–D–4.—*Distribution of intermediate (5-7) and upper (8-10) grade teachers by subject matter and education in 1955–56*

Subject matter of teacher	Grades 5–7					Grades 8–10					Total	
	Total (thousands)	Percent	By education in percent			Total (thousands)	Percent	By education in percent			Thousands	Percent
			HE[1]	TI[2]	Other			HE[1]	TI[2]	Other		
Language and literature	274.0	42.1	.....	.....	.....	109.3	34.4	.....	.....	.....	383.3	39.7
Russian language and literature, total.	154.9	23.8	.....	.....	.....	58.6	18.4	.....	.....	.....	213.5	22.1
In schools with Russian language of instruction	102.5	15.8	17.8	64.2	18.0	41.2	13.0	86.0	13.0	1.0	143.7	14.9
In schools with non-Russian language of instruction	52.4	8.1	11.6	51.9	36.5	17.4	5.4	71.7	23.1	5.2	69.8	7.2
Native (non-Russian) language and literature	61.2	9.4	18.0	59.6	22.4	18.9	5.9	80.6	17.2	2.2	80.1	8.3
English	13.1	2.0	58.8	24.3	16.9	9.9	3.1	88.0	9.3	2.7	23.0	2.4
German	40.0	6.2	13.8	25.6	60.6	18.6	5.9	58.2	23.9	17.9	58.6	6.1
French	4.8	0.7	56.0	25.6	18.4	3.3	1.1	85.2	11.0	3.8	8.1	0.8
History	78.9	12.2	25.3	57.0	17.7	46.2	14.6	85.8	13.0	1.2	125.1	13.0
Geography	40.3	6.2	31.5	47.3	21.2	22.8	7.2	83.2	14.7	2.1	63.0	6.5
Geography and natural sciences combined	31.7	4.9	6.5	67.9	25.6	3.9	1.2	54.2	40.7	5.1	35.6	3.7
Sciences and mathematics	221.8	34.4	.....	.....	.....	133.7	42.0	.....	.....	.....	355.6	36.8
Natural sciences[a]	46.7	7.2	21.7	53.3	25.0	17.6	5.5	77.7	19.6	2.7	64.4	6.7
Chemistry	12.4	2.0	30.2	49.5	20.3	24.6	7.7	88.9	10.0	1.1	37.0	3.8
Physics (only)	18.0	2.8	20.8	52.4	26.8	27.8	8.8	77.3	19.6	2.9	45.8	4.7
Physics and mathematics combined	60.9	9.4	6.0	63.1	30.9	16.0	5.0	57.8	38.3	3.9	76.9	8.0
Mathematics (only)	83.9	13.0	11.2	55.0	33.8	47.7	15.0	74.9	22.4	2.7	131.5	13.6
Other (unspecified)	1.3	0.2	7.7	21.5	70.8	2.0	0.6	70.1	5.2	24.7	3.3	0.3
Total	647.9	100.0	.....	.....	.....	317.9	100.0	.....	.....	.....	965.9	100.0

[a] General science—"nature studies" [*estestvoznanie*], botany, zoology, biology, human anatomy.
[1] Higher education.
[2] Teacher institute education.
Source: *KS–1956*, pp. 180–181.

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TABLE II–D–5.—*Distribution of intermediate (5-7) and upper (8-10) grade teachers by subject matter and education in 1958–59*

Subject matter of teacher	Grades 5–7					Grades 8–10					Total	
	Total (thousands)	Percent	By education in percent			Total (thousands)	Percent	By education in percent			Thousands	Percent
			HE[1]	TI[2]	Other			HE[1]	TI[2]	Other		
Language and literature	259.0	43.2	.....	.....	.....	101.0	33.5	.....	.....	.....	360.0	40.0
Russian language and literature, total	145.0	24.2	.....	.....	.....	52.0	17.3	.....	.....	.....	197.0	21.8
In schools with Russian language of instruction	98.0	16.4	37.7	56.2	6.1	34.0	11.3	90.0	9.5	0.5	132.0	14.6
In schools with non-Russian language of instruction	47.0	7.8	27.6	52.8	19.6	18.0	6.0	81.1	15.6	3.1	65.0	7.2
Native (non-Russian) language and literature	61.0	10.1	35.0	55.3	9.7	20.0	6.6	86.2	12.5	1.3	81.0	9.1
English	16.0	2.7	72.7	18.4	8.9	10.0	3.3	91.4	7.3	1.3	26.0	2.9
German	33.0	5.5	31.0	30.7	38.3	16.0	5.3	72.6	18.3	9.1	49.0	5.4
French	4.0	0.7	86.0	22.0	10.0	3.0	1.0	89.8	8.5	1.7	7.0	0.8
History	68.0	11.4	42.1	50.6	7.3	45.0	15.0	89.8	9.7	0.5	113.0	12.6
Geography	39.0	6.6	52.8	38.5	8.7	18.0	6.0	87.9	11.2	0.9	57.0	6.3
Geography and natural sciences combined[a]	29.0	4.8	17.2	70.4	12.4	4.0	1.3	64.1	33.1	2.8	33.0	3.7
Sciences and mathematics	204.0	34.0	.....	.....	.....	133.0	44.2	.....	.....	.....	337.0	37.4
Natural sciences[a]	45.0	7.5	36.5	50.7	12.8	15.0	5.0	81.8	16.5	1.7	60.0	6.7
Chemistry	11.0	1.8	48.0	42.2	9.8	26.0	8.6	92.1	7.3	0.6	37.0	4.1
Physics (only)	16.0	2.7	41.7	45.2	13.1	30.0	10.0	87.8	11.2	1.0	46.0	5.1
Physics and math combined	54.0	9.0	16.7	69.2	14.1	16.0	5.3	72.9	25.4	1.7	70.0	7.8
Mathematics (only)	78.0	13.0	28.5	56.5	15.0	46.0	15.3	85.3	13.8	0.9	124.0	13.7
Total	599.0	100.0	.....	.....	.....	301.0	100.0	.....	.....	.....	900.0	100.0

[a] General science includes "nature studies" (*estestvoznanie*), botany, zoology, biology, human anatomy.
[1] Higher education.
[2] Teacher institute education.
Source: *Nar Khoz–1959*, p. 819.

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TABLE II–F–1.—*Number of Soviet primary and secondary schools, by type of school, 1914, 1922–59*
(All figures in thousands)

Year end	Grand total, primary and secondary schools	"Regular" total	Elementary schools with grades 1–4 only	7-year with grades 1–7 only	10-year with grades 1–10	Other
	A	B	C	D	E	F
1914[a]	123.7	123.7	119.4	2.0	2.3	.....
1914[b]	105.5	105.5	101.9	1.6	2.0	0.0
1922	.....	88.6	82.6	3.5	2.5	(c)
1923	.....	91.8	85.7	4.0	2.0	0.1
1924	.....	93.6	87.6	4.0	1.8	0.2
1925	.....	103.3	96.4	4.8	1.6	0.4
1926	.....	111.0	102.7	5.7	1.7	0.9
1927	120.1	118.6	108.8	6.6	1.8	1.4
1928	.....	124.8	114.4	7.1	1.9	1.5
1929	.....	133.2	121.7	7.8	1.9	1.8
1930	.....	152.8	136.0	12.4	0.6	3.8
1931	.....	168.1	139.2	21.8	(c)	7.1
1932	.....	166.3	136.2	26.7	1.3	2.1
1933	.....	166.5	133.9	28.6	2.4	1.5
1934	.....	163.1	127.9	30.0	4.1	1.1
1935	.....	164.1	125.7	31.5	6.0	0.9
1936	.....	164.8	122.6	33.0	8.1	1.1
1937	.....	168.4	122.1	34.2	9.9	2.2
1938	.....	171.6	121.7	36.3	12.5	1.1
1939	.....	172.8	116.7	39.2	15.8	1.0
1940	198.8	191.5	125.9	45.7	18.8	1.1
1945	.....	186.8	131.6	41.7	12.8	0.7
1946	.....	193.2	136.9	42.9	12.9	0.5
1947	.....	197.2	139.7	44.1	12.9	0.5
1948	.....	199.3	139.1	46.7	13.0	0.5
1949	.....	201.0	132.1	54.9	13.6	0.5
1950	222.1	201.6	126.4	59.6	15.0	0.6
1951	.....	200.2	120.6	61.5	17.4	0.7
1952	.....	198.3	115.8	62.0	19.7	0.7
1953	213.0	197.0	112.1	61.8	22.3	0.8
1954	.....	197.7	111.1	60.4	25.2	0.9
1955	.....	195.3	108.8	58.7	26.9	0.9
1956	.....	196.6	110.3	57.1	28.3	0.9
1957	214.2	198.5	111.9	55.9	29.8	0.9
1958	215.2	199.7	112.4	55.7	30.7	0.9
1959	220.5	199.3	111.5	56.6	30.2	1.0

[a] Contemporary boundaries of the U.S.S.R. including post-war annexations.
[b] U.S.S.R. boundaries prior to September 1939.
[c] Negligible.

SOURCES AND NOTES TO TABLE II–F–1

Designation of columns is as follows

A.—All types of primary and secondary schools, including those for adults, working and rural youth.
B.—Total number of schools of "regular" type, including those for the physically handicapped and retarded children.
C.—Elementary schools with Grades 1–4 only.
D.—Intermediate 7-year schools with grades 1–7.
E.—Complete primary-secondary schools with grades 1–10.
F.—Schools for physically handicapped children.

Sources

Col. A, 1914, 1940–50, 1953, 1957, 1958.—NarKhoz–1959, pp. 90, 808–9.
Cols. B, C, D, E, F, 1922–38.—Kul't Stroi–1940, p. 27.
Cols. B, C, D, E, F, 1939–40, 1945–55.—KS–1956, p. 80.
Cols. B, C, D, E, F, 1914a, b; 1922–27, 1932, 1937, 1940–50, 1953, 1955–58.—NarKhoz–1959, pp. 812–13.
Cols. A B, 1959.—SSSR–Tsif–1959, p. 206.
Cols. A–F, 1959.—NarKhoz–1960, pp. 727, 729.

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Appendix to Chapter III

APPENDIX III–AR.—Rules for Admission to Regular Secondary Specialized Educational Establishments of the U.S.S.R. for the Academic Year 1959–60

TABLE III–A–1–S.—Aggregate Acceptances, Enrollment in and Graduations from Soviet Secondary Specialized Educational Establishments by Type of Program of Study in Selected Years, 1914–59

TABLE III–A–1–A.—Acceptances in Soviet Secondary Semiprofessional Schools, 1928–60

TABLE III–A–1–E—Enrollment in Soviet Secondary Semiprofessional Schools, 1928-59

TABLE III–A–1–G.—Graduations from Soviet Secondary Semiprofessional Schools, 1928–60

General Note to Tables III–A–1–A, III–A–1–E and III–A–1–G

Sources and Notes to Table III–A–1–A

Supplement to Table III–A–1–A

Sources and Notes to Table III–A–1–E

Supplement 1 to Table III–A–1–E

Supplement 2 to Table III–A–1–E

Sources and Notes to Table III–A–1–G

Supplement to Table III–A–1–G

TABLE III–A–2.—Relative Proportion of Women among Regular Full-time Students in Soviet Secondary Semiprofessional Establishments, 1927–59

TABLE III–A–3.—National Composition of Students Enrolled in Soviet Secondary Specialized Educational Establishments, Selected Years

APPENDIX III–B–1.—Specialties Offered in Soviet Semiprofessional Schools as of 1959

TABLE III–B–2.—Reconstructed Program of Instruction from Individual Course Syllabi of Soviet Technicum for Radio Engineering (Specialty 0704), 1958

TABLE III–B–3A.—General Technicum Curriculum in Mining Engineering

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TABLE III–B–5.—Secondary Semiprofessional School Curriculum in 3-Year (*Fel'dsher*) Medical Schools

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TABLE III–C–1.—Number of Soviet Secondary Semiprofessional Schools, 1914–59

TABLE III–C–2.—Number of Soviet Secondary Semiprofessional Schools by Administrative Jurisdiction and Republic as of January 1959

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APPENDIX III–AR.—*Rules for Admission to Regular Secondary Specialized Educational Establishments of the U.S.S.R. for the Academic Year 1959–60*

1. To regular secondary specialized educational establishments (technicums and other specialized schools) are admitted citizens of the U.S.S.R. of either sex, up to the age of 30, who have completed either a 7-year school or a complete secondary (10-year) school and who have presented favorable character and social references from Party, trade-union, Komsomol and other social organizations, and from the heads of industrial enterprises and institutions or from the management of collective farms or from the pedagogical councils of general education schools, and who have successfully passed the entrance examinations.

2. Persons having completed the 8th and 9th grades of a secondary school are admitted to secondary specialized schools on the same basis as graduates of the 7-year school. These persons must thereby present a certificate of completion of the 7-year school or a certificate of promotion into the respective upper grade (on a standard form bearing the school imprint, an official seal, and affixed with the signatures of the school director and teachers).

3. Applications for admission to secondary specialized educational establishments are accepted from June 1 to July 31. The application must state the training specialty which the applicant has chosen. Entrance examinations are held between August 1 and 20. Admissions are made [and posted] between August 21 and 25.

4. Application for admission should be addressed to the director of the secondary specialized educational establishment with the following enclosures:

a. Character and social reference-recommendations for entrance to a secondary specialized educational establishment.

b. Certificate (diploma) of completed education (original only), or certificate of promotion to grade 8, 9 or 10 of complete secondary school.

c. Transcript of record from the labor (employment) book, certified by the manager of the industrial plant or enterprise or, in the case of collective farmers, a transcript from the collective farmer's workbook.

d. An autobiography.

e. Copies of birth certificate (certified by a notary public), or a passport (which is to be presented in person).

f. Military service record book (for persons in the reserve) or a draft-call registration certificate (for persons of military service age) is to be presented in person.

g. Three photographs (without hat, size 3x4 centimeters).

h. A health certificate for entrants to higher or secondary specialized educational establishments (according to standard form No. 286), completed by the school physician or by the district physician of a children's or general hospital (or clinic).

i. Certificate of place of domicile.

NOTE.—Transcript of record from labor books is required only of persons who have been actively employed for a period of not less than 2 years.

5. The director of the secondary specialized educational establishment or, upon his direction, a deputy director in charge of instruction, and the heads of departments should personally acquaint themselves [by interview] with each applicant to the secondary specialized educational establishment and must notify the applicant about the results of the processing of his application within 5 days after receipt of the application.

Replies to written inquiries by applicants and all notifications must be signed by the director of the institution or by his deputy in charge of instruction.

6. Applicants to secondary specialized educational establishments who are entering from the 7-year school must take entrance examinations in the following subjects:

a. Russian language (written—dictation)
b. Russian language and literary reading (oral)
c. Mathematics (oral)

Applicants to secondary specialized establishments in which instruction is conducted in a non-Russian language are examined in the language (written—dictation, and oral examination) in which the instruction is conducted. In addition, applicants must take a qualifying examination in the Russian language, the results of which are not taken into account in determining the relative standing in the competitive selection provided that the qualifying examination is satisfactory.

NOTE.—1. In technicums for physical culture training and in schools for music, the expressive arts and the theater, the entrance examinations in mathematics are not required.

2. Applicants to normal [school teacher-pedagogical] and cultural-educational schools are subjected to supplemental tests in their musical and auro-tonal aptitude, which are conducted prior to the other examinations, and persons who do not fulfill the requirements are barred from taking the other entrance examinations [i.e., admission denied].

3. The grades for the Russian language test (written—dictation), and the Russian language and literary reading (oral) are given separately. No combined grade is given.

7. Applicants to secondary specialized educational establishments who are entering from complete secondary school must take entrance examinations in the following subjects:

a. Applicants to specialties in the fields of in-

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dustry, construction, transportation, communications, agriculture, and economics take examinations in Russian language and literature (written—essay) and mathematics (written and oral);

b. Applicants to specialties in all other fields take examinations in Russian language and literature (written—essay) and history of the U.S.S.R. (oral).

Applicants to secondary specialized educational establishments in which instruction is conducted in a non-Russian language are examined in the literature and language (written—essay) in which instruction is conducted, and in addition they must pass a qualifying oral examination in the Russian language, the results of which are not taken into account in determining the relative standing of the applicant in competitive selection provided that the results of these tests are satisfactory.

NOTE:—1. Applicants to pedagogical (normal) schools must take examinations in Russian language and literature (written—essay), and in arithmetic (oral).

2. Applicants to teachers' schools and pedagogical schools for preschool teaching and cultural-educational schools are tested also for their musical and auro-tonal aptitude. This test is conducted prior to the other examinations, and persons who do not fulfill the requirement are barred from taking the other examinations [i.e., admission denied].

3. Grades for the written and oral examinations in mathematics are given separately, and no combined grade is given.

8. Entrance examinations are conducted in accordance with programs approved by the Ministry of Higher Education of the U.S.S.R.,* with the exception of examinations in the native [non-Russian] language and literature, which are conducted on the basis of the programs set forth in the corresponding general education schools of the [national] republic.

9. In addition to the examination subjects indicated in paragraphs 6 and 7, applicants to architectural specialties are tested in drawing, and applicants to expressive arts, musical and theatrical specialties, and to the specialty of physical culture training are tested, in addition, in aptitude for their respective specialty. These examinations are conducted by commissions of specialists appointed by the director in accordance with programs approved by the Main Administrations (Divisions) of Education and Training of the respective ministries and departments.

Entrance examinations in the given specialties are conducted prior to other examinations and persons who do not fulfill the requirement are barred from taking the other examinations [i.e., admission denied].

10. Each person allowed to take entrance examinations is issued an examination record form affixed with his photograph and sealed with the official stamp of the educational establishment.

11. Entrance examinations are conducted, as a rule, by the regular staff instructors in a given subject who are appointed for this purpose by the director of the educational establishment.

12. The results of the entrance examinations are evaluated on the basis of a numerical, five-grade system, with grades entered into the record both numerically and written out [i.e., 4—four].

13. Persons receiving an unsatisfactory grade in one of the oral or written examinations are not permitted to take any further entrance examinations. Taking an entrance examination over in case of unsatisfactory grade or for purposes of improving an earlier grade is not permitted.

Appearance at examinations at a strictly specified time is obligatory. Persons absent from an examination without valid reason are not permitted to take any further examinations. In case of illness, the applicant must notify the study office of his inability to be present at the examination prior to the beginning of the examination session. In such a case the applicant may be allowed to take the examination at a time provided for other groups of applicants.

14. Admission to secondary specialized educational establishments is determined by a committee on admissions, which is formed under the chairmanship of the director, with the participation of the deputy director for instruction, the heads of departments and representatives of the social organizations [i.e., Communist Party, Komsomol, trade union] of the institution.

Persons who have an active employment record of not less than two years and who pass the entrance examinations satisfactorily are given preference and are admitted without the competitive entrance requirement [*vne konkursa*].

The remaining vacancies are filled with other categories of applicants on the basis of the competitive entrance requirement.

NOTE.—1. Persons who were awarded honor certificates [*otlichniki*] upon the completion of the 7-year school and persons who were awarded gold or silver medals upon the completion of the secondary (10-year) school are given first preference in acceptances.

2. Time served in the Soviet Army or Navy by persons demobilized from the Armed Forces who are planning to enter secondary specialized educational establishments is counted, for the purposes of admission, as a record of active employment.

3. If the number of applications from persons with 2 or more years of active employment exceeds 80 per cent of the planned quota for admissions, the directors are to set aside 20 per cent of the planned number of admission vacancies for entrants on the basis of competitive entrance examinations.

The list of persons admitted and rejected is posted for general information. In the list of rejected applicants the reason for rejection must be indicated.

15. Persons who have passed the entrance examinations satisfactorily but who were not

* Now called the Ministry of Higher and Secondary Specialized Education.

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accepted to the specialty for which they applied on the basis of the competitive requirement can be accepted in another specialty if there are vacancies and if they pass additional examinations required for admission to study that specialty.

Persons who passed the entrance examinations but were not accepted on the basis of the competition are issued certificates to that effect on an established form.

16. Persons who have been admitted as students of a secondary specialized educational establishment but who do not enroll prior to September 10 without valid reason are dismissed from the rank of students.

17. In case of vacancies (after the admission of all persons who passed the entrance examinations in a given institution), the directors of secondary specialized educational establishments are permitted to accept (from August 25 to September 10) persons who have passed the 1959 entrance examinations in another secondary specialized or higher educational establishment but who were not admitted there on the basis of the competitive selection. These persons may be admitted on the basis of certificates of an established form. [These certificates give the grades in the subjects in which the person was examined and state that he was not admitted on the basis of the competitive requirement.]

Persons applying to secondary specialized educational establishments on the basis of the above-mentioned certificates are credited only with those examinations which are required from applicants to a given institution.

18. The director of the secondary specialized educational establishment may, upon directive from the Chief Administration (Division) of Education and Training of a ministry, department, regional council of the national economy, executive committee of the Council of Deputies of Toilers, require before the beginning of the examinations an additional certification of all applicants which is made under the rules for medical selection of persons entering higher and secondary specialized educational establishments, approved jointly by the Ministry of Public Health of the U.S.S.R. and by the Ministry of Higher Education of the U.S.S.R. as of July 11, 1955, and verified in a memorandum from the Ministry of Higher Education of the U.S.S.R. as of July 30, 1955, as Instruction Letter No. I–97. A definition of the degree of illness and limitation to admission for reasons of health is made by the medical commission of the secondary specialized educational establishment in accordance with the conditions for the health requirement during study in that educational institution and in further work in a given specialty.

19. Persons who did not pass the entrance examination or were not accepted on the basis of the competitive selection should receive their personal documents not later than 3 days after their petition to have the documents returned has been filed.

20. The written examination papers of persons in secondary specialized educational establishments must be kept in their personal files until their graduation. The written examination papers of persons not admitted to secondary specialized educational establishments are kept by the institution for 3 months, after which time they are destroyed.

TABLE III–A–1–S.—*Aggregate acceptances, enrollment in and graduations from Soviet secondary specialized educational establishments by type of program of study in selected years, 1914–1959*

[All figures in thousands]

	1914	1927	1932	1940	1950	1953	1955	1956	1957	1958	1959
Acceptances:											
Total	..	56.2	424.0	382.9	426.3	558.0	587.5	594.6	557.2	584.1	656.2
Regular day	..	56.2	424.0	318.6	349.5	438.0	423.9	386.3	358.4	363.7	378.4
Evening	..			12.6	15.6	48.0	54.8	78.0	71.7	75.2	98.7
Extension	..	(n)	(n)	57.1	61.2	72.0	108.8	130.3	127.1	145.2	179.1
Enrollment:											
Total	45.0	189.0	724.0	975.0	1,298.0	1,646.0	1,960.0	2,012.0	1,941.0	1,876.0	1,907.0
Regular day	54.0	189.0	724.0	787.0	1,065.0	1,328.0	1,470.0	1,407.0	1,259.0	1,125.0	1,067.0
Evening	(n)			32.0	52.0	118.0	204.0	254.0	281.0	303.0	318.0
Extension	(n)	(n)	(n)	156.0	181.0	200.0	286.0	351.0	401.0	448.0	522.0
Graduations:											
Total	..	28.6	107.7	236.8	313.7	295.5	387.8	510.1	504.0	551.2	527.9
Regular day	..	28.6	107.7	205.3	279.0	264.0	345.1	448.9	434.0	463.2	396.0
Evening	..			2.5	4.7	9.5	16.0	25.2	30.8	37.5	67.1
Extension	..	(n)	(n)	29.0	30.0	22.0	26.7	36.0	39.2	50.5	64.8

n—None.

Sources and Notes: *NarKhoz-1959*, pp. 830, 835, 837. Prior to 1938, extension-correspondence students were not counted as students but as attendants of training courses. Until 1958 the reporting of "regular" students meant aggregate students in day and evening divisions (*"statsionarnye"*). 1959 figures from *SSSR–Tsif–1959*, pp. 211-12; and *NarKhoz–1960*, pp. 740, 745–46.

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TABLE III–A–1–A.—*Acceptances in Soviet*

[All figures

		(a) 1928	(b) 1929	(c) 1930	(d) 1931	(e) 1932	(f) 1933	(g) 1934	(h) 1935	(i) 1936	(j) 1937	(k) 1938	(l) 1939	(m) 1940
1. Engineering-industrial	T	17.7	25.1	165.9	126.3	177.8	108.6	99.3	91.0	79.0	78.2	93.1	..	103.1
	R	17.7	25.1	165.9	126.3	177.8	108.6	99.3	91.0	79.0	.78.2	93.1	..	98.6
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	..	4.5
A. Industry and construction	T	..	..	..	..	124.0	77.6	70.8	65.7	58.8	58.1	69.2	..	80.2
	R	..	..	..	..	124.0	77.6	70.8	65.7	58.8	58.1	69.2	..	76.5
	E	..	..	..	..	(a)	(a)	(a)	(a)	(a)	(a)	(a)	..	3.7
B. Transportation and communication	T	..	..	..	..	53.8	31.0	28.5	25.3	20.2	20.1	23.9	..	22.9
	R	..	..	..	..	53.8	31.0	28.5	25.3	20.2	20.1	23.9	..	22.1
	E	..	..	..	..	(a)	(a)	(a)	(a)	(a)	(a)	(a)	..	0.8
2. Agricultural	T	5.2	13.1	52.0	72.6	63.8	49.1	61.1	49.8	42.8	44.9	48.2	..	48.1
	R	5.2	13.1	52.0	72.6	63.8	49.1	61.1	49.8	42.8	44.9	48.2	..	47.1
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	..	1.0
3. Socioeconomic	T	3.9	5.0	23.0	28.9	44.3	18.1	15.9	13.0	12.3	12.0	13.4	..	18.6
	R	3.9	5.0	23.0	28.9	44.3	18.1	15.9	13.0	12.3	12.0	13.4	..	18.4
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	..	0.2
4. Educational-cultural and arts (total)	T	21.4	31.9	99.7	111.3	95.5	79.2	93.2	94.8	105.7	104.7	114.3	..	127.6
	R	21.4	31.9	99.7	111.3	95.5	79.2	93.2	94.8	105.7	104.7	114.3	..	81.6
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	..	46.0
A. Education (universities, pedagogical and teachers' institutes, and cultural)	T	..	..	..	..	..	..	..	..	96.2	95.5	105.5	..	117.4
	R	..	..	..	..	..	..	..	..	96.2	95.5	105.5	..	71.4
	E	..	..	..	..	..	..	..	..	(a)	(a)	(a)	..	46.0
B. Arts	T	..	..	..	..	..	..	..	..	9.5	9.2	8.8	..	10.2
	R	..	..	..	..	..	..	..	..	9.5	9.2	8.8	..	10.2
	E	..	..	..	..	..	..	..	..	(a)	(a)	(a)	..	(a)
5. Medical and health (including physical culture)	T	8.0	9.6	18.2	22.1	42.6	32.5	33.3	45.6	83.1	128.9	126.0	..	85.5
	R	8.0	9.6	18.2	22.1	42.6	32.5	33.3	45.6	83.1	128.9	126.0	..	85.5
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	..	(a)
6. Grand total	T	56.2	84.7	358.8	361.2	424.0	287.5	302.8	294.2	322.9	368.7	395.0	387.2	382.9
	R	56.2	84.7	358.8	361.2	424.0	287.5	302.8	294.2	322.9	368.7	395.0	387.2	331.2
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	51.7

[a] None.

T—Total. R—Regular. E—Extension-correspondence.

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secondary semiprofessional schools, 1928–60
in thousands]

(n) 1941	(o) 1942	(p) 1943	(q) 1944	(r) 1945	(s) 1946	(t) 1947	(u) 1948	(v) 1949	(w) 1950	(x) 1951	(y) 1952	(z) 1953	(aa) 1954	(bb) 1955	(cc) 1956	(dd) 1957	(ee) 1958	(ff) 1959	(gg) 1960
..	..	..	..	130.1	..	..	..	..	170.2	..	..	259.0	289.5	294.0	316.6	271.1	268.1	322.8	..
..	..	..	..	129.2	..	..	..	..	160.0	..	..	..	254.4	245.8	..	..	..	..	..
..	..	..	..	0.9	..	..	..	..	10.2	..	..	..	35.1	48.2	..	..	..	..	..
..	..	..	..	108.1	..	..	..	..	142.2	..	..	218.6	245.3	245.5	258.0	255.4	221.5	271.2	..
..	..	..	..	107.2	..	..	..	..	135.5	..	..	..	214.0	209.3	..	..	..	..	..
..	..	..	..	0.9	..	..	..	..	6.7	..	..	..	26.3	36.2	..	..	..	..	..
..	..	..	..	22.0	..	..	..	..	28.0	..	..	40.4	44.2	48.5	58.6	45.7	46.6	51.6	..
..	..	..	..	22.0	..	..	..	..	24.5	..	..	..	35.2	36.5	..	..	..	..	..
..	..	..	..	(n)	..	..	..	..	3.5	..	..	..	8.8	12.0	..	..	..	..	..
..	..	..	..	49.0	..	..	..	..	59.3	..	..	94.6	97.7	98.2	90.6	98.8	108.4	111.3	..
..	..	..	..	49.0	..	..	..	..	53.8	..	..	..	82.1	81.3	..	..	..	..	..
..	..	..	..	(n)	..	..	..	..	5.5	..	..	..	15.6	16.9	..	..	..	..	..
..	..	..	..	35.0	..	..	..	..	34.8	..	..	40.4	46.3	51.7	56.4	60.5	70.3	77.0	..
..	..	..	..	26.1	..	..	..	..	25.3	..	..	..	28.5	27.9	..	..	..	..	..
..	..	..	..	8.9	..	..	..	..	9.5	..	..	..	7.8	23.8	..	..	..	..	..
..	..	..	..	104.8	..	..	..	..	113.7	..	..	90.6	89.5	62.4	56.9	59.1	69.8	74.6	..
..	..	..	..	79.1	..	..	..	..	77.7	..	..	..	63.8	47.2	..	..	..	..	..
..	..	..	..	25.7	..	..	..	..	36.0	..	..	..	16.7	15.7	..	..	..	..	..
..	..	..	..	93.2	..	..	..	..	105.8	..	..	82.8	71.9	51.7	47.5	48.7	58.5	61.9	..
..	..	..	..	67.5	..	..	..	..	70.0	..	..	..	55.5	36.5	..	..	..	..	..
..	..	..	..	25.7	..	..	..	..	35.8	..	..	..	16.4	15.2	..	..	..	..	..
..	..	..	..	11.6	..	..	..	..	7.9	..	..	7.8	8.6	10.7	9.4	10.4	11.3	12.7	..
..	..	..	..	11.6	..	..	..	..	7.7	..	..	..	8.3	10.7	..	..	..	..	..
..	..	..	..	(n)	..	..	..	..	0.2	..	..	..	0.3	(n)	..	..	..	..	..
..	..	..	..	68.8	..	..	..	..	48.3	..	..	73.4	80.8	81.2	74.1	67.7	67.5	70.5	..
..	..	..	..	68.8	..	..	..	..	48.3	..	..	..	80.7	76.5	..	..	..	..	..
..	..	..	..	(n)	..	..	..	..	(n)	..	..	..	0.1	4.7	..	..	..	..	..
..	..	..	..	387.6	433.8	423.3	430.9	430.0	426.3	458.4	500.0	558.0	594.8	587.5	594.6	557.2	584.1	656.2	769.0
..	170.0	253.0	..	352.1	394.2	379.4	359.6	364.5	365.1	406.3	440.1	486.0	509.5	478.7	464.3	430.1	438.9	477.1	..
..	..	..	..	35.5	39.6	43.9	71.3	65.5	61.2	52.1	59.9	72.0	85.3	108.8	130.3	127.1	145.2	179.1	..

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TABLE III–A–1–E.—*Enrollment in Soviet*

[All figures

		(a) 1928	(b) 1929	(c) 1930	(d) 1931	(e) 1932	(f) 1933	(g) 1934	(h) 1935	(i) 1936	(j) 1937	(k) 1938	(l) 1939	(m) 1940	(n) 1941	(o) 1942
1. Engineering-industrial (total)	T	53.4	..	..	..	..	..	..	..	..	..	..	..	241.9	..	..
	R	53.4	68.8	264.9	294.6	345.5	241.9	250.1	221.1	230.5	222.3	235.9	252.9	234.7	..	..
	E	(n)	..	..	..	..	..	..	..	..	..	..	..	7.2	..	..
A. Industry and construction	T	..	..	..	..	..	..	..	..	..	..	..	..	187.5	..	..
	R	..	..	..	203.6	242.2	..	178.9	149.7	159.2	162.8	173.2	190.0	..	..	..
	E	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
B. Transportation and communication	T	..	..	..	..	..	..	..	..	..	..	..	..	54.4	..	..
	R	..	..	..	91.0	103.3	..	71.2	71.4	71.3	59.5	62.7	62.9	..	..	..
	E	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Agricultural	T	32.2	..	..	..	..	..	..	..	..	..	..	..	114.7	..	..
	R	32.2	38.3	97.0	147.7	150.6	102.8	125.0	123.9	131.2	136.2	136.9	137.7	113.2	..	..
	E	(n)	..	..	..	..	..	..	..	..	..	..	..	1.5	..	..
3. Socioeconomic	T	13.6	..	..	..	..	..	..	..	..	..	..	..	43.1	..	..
	R	13.6	14.6	40.7	39.6	49.5	34.6	35.6	40.0	35.0	29.7	30.0	35.9	42.8	..	..
	E	(n)	..	..	..	..	..	..	..	..	..	..	..	0.3	..	..
4. Educational-cultural	T	87.0	..	..	..	..	..	..	..	..	..	..	..	370.7	..	..
	R	87.0	89.3	147.4	187.7	192.1	164.8	186.2	177.1	209.8	253.7	285.7	270.3	224.4	..	..
	E	(n)	..	..	..	..	..	..	..	..	..	..	..	146.3	..	..
A. Education (universities, pedagogical and teachers' institutes) and cultural	T	71.0	..	..	..	..	..	..	..	..	..	..	..	345.3	..	..
	R	71.0	74.2	129.4	..	..	..	..	..	..	228.0	256.0	242.4	199.1	..	..
	E	(n)	..	..	..	..	..	..	..	..	..	..	..	146.2	..	..
B. Arts	T	16.0	..	..	..	..	..	..	..	..	..	..	..	25.4	..	..
	R	16.0	15.1	18.0	..	..	..	..	..	..	25.7	29.7	27.9	25.3	..	..
	E	(n)	..	..	..	..	..	..	..	..	..	..	..	0.1	..	..
5. Medical and health (including physical culture)	T	21.6	..	..	..	..	..	..	..	..	..	..	..	204.4	..	..
	R	21.6	24.6	43.7	52.5	59.3	57.5	71.6	98.8	163.9	220.4	263.4	248.2	204.4	..	..
	E	(n)	..	..	..	..	..	..	..	..	..	..	..	(n)	..	..
6. Actual Total	T	207.8	..	..	..	..	..	..	..	..	..	..	..	974.8	..	..
	R	207.8	235.6	593.7	722.1	797.0	601.6	688.5	660.9	770.4	862.5	951.9	945.0	819.5	..	..
	E	(n)	..	..	..	..	..	..	..	..	..	..	..	155.3	..	..
7. Reported Grand Total	T	206.3	..	..	..	..	..	..	..	..	..	..	..	974.8	..	..
	R	206.3	237.5	586.8	707.3	723.7	588.9	671.5	712.9	768.9	862.5	951.9	945.0	819.5	..	..
	E	(n)	..	..	..	..	..	..	..	..	..	..	..	155.3	..	..

T—Total. R—Regular. E—Extension-correspondence.

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secondary semiprofessional schools, 1928–59
in thousands]

(p) 1943	(q) 1944	(r) 1945	(s) 1946	(t) 1947	(u) 1948	(v) 1949	(w) 1950	(x) 1951	(y) 1952	(z) 1953	(aa) 1954	(bb) 1955	(cc) 1956	(dd) 1957	(ee) 1958	(ff) 1959
..	..	365.5	..	..	..	..	538.5	..	..	..	897.3	993.4	..	..	..	..
..	..	..	..	..	..	..	512.9	..	..	..	..	878.9	..	..	..	..
..	..	..	..	..	..	..	25.6	..	..	..	..	114.5	..	..	..	..
..	..	298.1	..	..	..	..	449.9	..	..	..	762.9	843.1	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	67.4	..	..	..	..	88.6	..	..	..	134.4	150.3	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	119.0	..	..	..	..	162.0	..	..	..	312.8	337.8	..	..	..	..
..	..	..	..	..	..	..	152.9	..	..	..	..	289.5	..	..	..	..
..	..	..	..	..	..	..	9.1	..	..	..	..	48.3	..	..	..	..
..	..	80.0	..	..	..	..	93.4	..	..	..	119.5	134.6	..	..	..	..
..	..	..	..	..	..	..	65.6	..	..	..	..	76.8	..	..	..	..
..	..	..	..	..	..	..	27.8	..	..	..	..	57.8	..	..	..	..
..	..	274.7	..	..	..	..	377.7	..	..	..	312.9	278.7	..	..	..	..
..	..	..	..	..	..	..	259.5	..	..	..	..	218.0	..	..	..	..
..	..	..	..	..	..	..	118.2	..	..	..	..	60.7	..	..	..	..
..	..	250.8	..	..	..	..	347.5	..	..	..	282.2	247.2	..	..	..	..
..	..	..	..	..	..	..	229.6	..	..	..	..	186.5	..	..	..	..
..	..	..	..	..	..	..	117.9	..	..	..	..	60.7	..	..	..	..
..	..	23.9	..	..	..	..	30.2	..	..	..	30.7	31.5	..	..	..	..
..	..	..	..	..	..	..	29.9	..	..	..	..	31.5	..	..	..	..
..	..	..	..	..	..	..	0.3	..	..	..	..	(n)	..	..	..	..
..	..	168.5	..	..	..	..	126.0	..	..	..	196.2	215.9	..	..	..	..
..	..	..	..	..	..	..	126.0	..	..	..	..	210.7	..	..	..	..
..	..	..	..	..	..	..	(n)	..	..	..	..	5.2	..	..	..	..
..	..	1007.7	..	..	..	..	1297.6	..	..	..	1838.7	1960.4	..	..	..	..
..	..	..	..	..	..	..	1116.9	..	..	..	..	1673.9	..	..	..	..
..	..	..	..	..	..	..	180.7	..	..	..	..	286.5	..	..	..	..
..	..	1007.7	1174.5	1231.6	1264.0	1309.2	1297.6	1368.9	1477.4	1645.5	1838.7	1960.4	2012.0	1941.0	1876.0	1907.0
500.0	700.0	907.0	1043.6	1079.6	1093.5	1133.9	1116.9	1200.0	1300.7	1446.2	1603.7	1673.9	1661.0	1540.0	1428.0	1384.0
..	..	100.7	130.9	152.0	170.5	175.3	180.7	168.9	176.7	199.3	235.0	286.5	351.0	401.0	448.0	523.0

n—None.

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TABLE III–A–1–G.—*Graduations from Soviet secondary semiprofessional schools, 1928–1960*

[All figures in thousands]

		(a) 1928	(b) 1929	(c) 1930	(d) 1931	(e) 1932	X-1 1 FYP, 1929–32 Total	X-1 1 FYP, 1929–32 Per annum	(f) 1933	(g) 1934	(h) 1935	(i) 1936	(j) 1937	X-2 2 FYP, 1933–37 Total	X-2 2 FYP, 1933–37 Per annum	(k) 1938	(l) 1939	(m) 1940	X-3 3 FYP, 1938–40 Total	X-3 3 FYP, 1938–40 Per annum	(n) 1941	(o) 1942	(p) 1943	(q) 1944
1. Engineering-industrial	T	6.8	8.3	14.0	29.6	46.7	98.6	24.65	52.6	36.7	45.4	40.9	37.6	213.2	42.64	44.1	41.1	30.0	115.2	38.40	..	..	..	..
	R	6.8	8.3	14.0	29.6	46.7	98.6	24.65	52.6	36.7	45.4	40.9	37.6	213.2	42.64	44.1	41.1	29.8	115.0	38.34	..	..	..	..
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	0.2	0.2	.06	..	..	..	..
A. Industry and construction	T	..	..	..	..	33.6	..	..	31.4	29.2	31.9	27.9	27.1	147.5	29.50	30.5	28.9	21.7	81.1	27.04	..	..	..	..
	R	..	..	..	..	33.6	..	..	31.4	29.2	31.9	27.9	27.1	147.5	29.50	30.5	28.9	21.6	81.0	27.01	..	..	..	..
	E	..	..	..	..	(a)	..	..	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	0.1	0.1	.03	..	..	..	..
B. Transportation and communication	T	..	..	..	..	13.1	..	..	21.2	7.5	13.5	13.0	10.5	65.7	13.14	13.6	12.2	8.3	34.1	11.36	..	..	..	..
	R	..	..	..	..	13.1	..	..	21.2	7.5	13.5	13.0	10.5	65.7	13.14	13.6	12.2	8.2	34.0	11.33	..	..	..	..
	E	..	..	..	..	(a)	..	..	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	0.1	0.1	.03	..	..	..	..
2. Agricultural	T	4.4	6.1	9.9	17.8	24.2	58.0	14.50	25.2	14.2	14.5	17.5	23.0	94.0	18.80	28.8	27.2	21.5	77.5	25.83	..	..	..	..
	R	4.4	6.1	9.9	17.8	24.2	58.0	14.50	25.2	14.2	14.5	17.5	23.0	94.0	18.80	28.8	27.2	21.5	77.5	25.83	..	..	..	..
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(negl.)	(negl.)	(negl.)	..	..	..	..
3. Socioeconomic	T	1.2	2.5	3.0	3.8	5.2	14.5	3.62	7.2	6.9	6.5	7.3	7.8	35.7	7.14	7.3	7.9	7.2	22.4	7.46	..	..	..	..
	R	1.2	2.5	3.0	3.8	5.2	14.5	3.62	7.2	6.9	6.5	7.3	7.8	35.7	7.14	7.3	7.9	7.2	22.4	7.46	..	..	..	..
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	..	..	..	..
4. Educational-cultural and arts (total)	T	11.3	16.1	25.2	22.5	18.7	82.5	20.62	33.2	28.5	31.1	37.6	49.1	179.5	35.90	57.2	68.6	87.8	213.6	71.20	..	..	..	..
	R	11.3	16.1	25.2	22.5	18.7	82.5	20.62	33.2	28.5	31.1	37.6	49.1	179.5	35.90	57.2	68.6	58.9	184.7	61.56	..	..	..	..
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	28.9	28.9	9.64	..	..	..	..
A. Education (universities, pedagogical and teachers' institutes) and cultural	T	..	..	..	..	..	..	..	..	..	..	35.5	46.9	..	..	54.4	65.6	85.8	205.8	68.60	..	..	..	..
	R	..	..	..	..	..	..	..	..	..	..	35.5	46.9	..	..	54.4	65.6	56.9	176.9	58.96	..	..	..	..
	E	..	..	..	..	..	..	..	..	..	..	(a)	(a)	..	..	(a)	(a)	28.9	28.9	9.64	..	..	..	..
B. Arts	T	..	..	..	..	..	..	..	..	..	..	2.1	2.2	..	..	2.8	3.0	2.0	7.8	2.60	..	..	..	..
	R	..	..	..	..	..	..	..	..	..	..	2.1	2.2	..	..	2.8	3.0	2.0	7.8	2.60	..	..	..	..
	E	..	..	..	..	..	..	..	..	..	..	(a)	(a)	..	..	(a)	(a)	(a)	(a)	(a)	..	..	..	..
5. Medical and health (including physical culture)	T	4.8	4.9	9.3	10.5	12.9	37.6	9.40	14.5	11.0	14.7	21.6	38.4	100.2	20.04	63.8	95.2	90.4	249.4	83.13	..	..	..	..
	R	4.8	4.9	9.3	10.5	12.9	37.6	9.40	14.5	11.0	14.7	21.6	38.4	100.2	20.04	63.8	95.2	90.4	249.4	83.13	..	..	..	..
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	..	..	..	..
6. Grand total	T	28.6	37.9	61.4	84.2	107.7	291.2	72.80	132.7	97.3	112.2	124.9	155.9	623.0	124.60	201.2	240.1	236.9	678.2	226.06	..	..	..	..
	R	28.6	37.9	61.4	84.2	107.7	291.2	72.80	132.7	97.3	112.2	124.9	155.9	623.0	124.60	201.2	240.1	207.8	649.1	216.36	158.0	..	..	..
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	29.1	29.1	9.70	..	..	..	..

[a] None negl.–negligible. T—Total. R—Regular. E—Extension-correspondence.

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			X-4							X-5							X-6		XX					
			War Years 1941-45							4 FYP, 1946-50							5 FYP, 1951-55							
		(r) 1945	Total	Per annum	(s) 1946	(t) 1947	(u) 1948	(v) 1949	(w) 1950	Total	Per annum	(x) 1951	(y) 1952	(z) 1953	(aa) 1954	(bb) 1955	Total	Per annum	Total 1928-1955	(cc) 1956	(dd) 1957	(ee) 1958	(ff) 1959	(gg) 1960
1. Engineering-industrial	T	19.5	81.3	16.26	..	..	..	..	104.3	391.4	78.28	..	..	102.8	127.5	164.7	602.3	120.46	1508.8	220.1	205.5	261.9	264.8	225.8
	R	19.5	..	..	..	..	..	..	103.9	..	..	..	..	..	124.1	159.8	..	..	..	..	..	..	..	..
	E	(negl.)	..	..	..	..	..	..	0.4	..	..	..	..	..	3.4	4.9	..	..	..	..	..	..	..	..
A. Industry and construction	T	16.0	62.8	12.56	..	..	..	..	85.4	317.9	63.58	..	..	87.4	108.3	140.8	509.9	101.98	..	186.9	168.7	219.7	224.7	189.8
	R	16.0	..	..	..	..	..	..	85.1	..	..	..	..	..	106.0	137.5	..	..	..	..	..	..	..	..
	E	(negl.)	..	..	..	..	..	..	0.3	..	..	..	..	..	2.3	3.3	..	..	..	..	..	..	..	..
B. Transportation and communication	T	3.5	18.5	3.70	..	..	..	..	18.9	73.5	14.70	..	..	15.4	19.2	23.9	92.4	18.48	..	33.2	36.8	42.2	40.5	36.0
	R	3.5	..	..	..	..	..	..	18.8	..	..	..	..	..	18.1	22.3	..	..	..	..	..	..	..	..
	E	(a)	..	..	..		..	..	0.1	..	..	..	..	..	1.1	1.6	..	..	..	..	..	..	..	..
2. Agricultural	T	19.8	64.2	12.84	..	..	..	..	48.7	188.2	37.64	..	..	51.6	55.2	57.8	220.2	44.04	706.9	76.8	82.8	96.3	89.5	79.7
	R	19.8	..	..	..	..	..	..	48.6	..	..	..	..	..	54.2	55.9	..	..	..	..	..	..	..	..
	E	(negl.)	..	..	..	..	..	..	0.1	..	..	..	..	..	1.0	1.9	..	..	..	..	..	..	..	..
3. Socioeconomic	T	8.2	29.6	5.92	..	..	..	..	24.9	108.4	21.68	..	..	26.2	26.6	30.5	130.3	26.06	342.1	39.1	41.4	45.2	50.3	56.7
	R	7.4	..	..	..	..	..	..	21.9	..	..	..	..	..	21.8	24.6	..	..	..	..	..	..	..	..
	E	0.8	..	..	..	..	..	..	3.0	..	..	..	..	..	4.8	5.9	..	..	..	..	..	..	..	..
4. Educational-cultural and arts (total)	T	38.1	179.8	35.96	..	..	..	..	81.6	316.9	63.38	..	..	69.9	72.8	78.5	377.8	75.56	1361.5	95.0	84.6	70.6	52.3	56.4
	R	26.9	..	..	..	..	..	..	55.2	..	..	..	..	..	59.8	64.5	..	..	..	..	..	..	..	..
	E	11.2	..	..	..	..	..	..	26.4	..	..	..	..	..	13.0	14.0	..	..	..	..	..	..	..	..
A. Education (universities, pedagogical and teachers' institutes) and cultural	T	37.2	174.4	34.88	..	..	..	..	76.6	301.6	60.32	..	..	65.6	68.4	73.5	353.9	70.78	..	89.3	78.2	63.4	45.1	48.1
	R	26.0	..	..	..	..	..	..	50.2	..	..	..	..	..	55.4	59.5	..	..	..	..	..	..	..	..
	E	11.2	..	..	..	..	..	..	26.4	..	..	..	..	..	13.0	14.0	..	..	..	..	..	..	..	..
B. Arts	T	0.9	5.4	1.08	..	..	..	..	5.0	15.3	3.06	..	..	4.3	4.4	5.0	23.9	4.78	..	5.7	6.4	7.2	7.2	8.3
	R	0.9	..	..	..	..	..	..	5.0	..	..	..	..	..	4.4	5.0	..	..	..	..	..	..	..	..
	E	(a)	..	..	..	..	..	..	(a)	..	..	..	..	..	(a)	(a)	..	..	..	..	..	..	..	..
5. Medical and health (including physical culture)	T	32.5	184.9	36.98	..	..	..	..	54.2	273.6	54.72	..	..	45.0	50.3	56.3	228.9	45.78	1079.4	79.1	89.7	77.2	71.0	64.2
	R	32.5	..	..	..	..	..	..	54.2	..	..	..	..	..	50.3	56.3	..	..	..	..	..	..	..	..
	E	(a)	..	..	..	..	..	..	(a)	..	..	..	..	..	(a)	(a)	..	..	..	..	..	..	..	..
6. Grand total	T	118.1	539.8	107.96	180.1	238.0	277.3	269.4	313.7	1278.5	255.70	263.2	280.6	295.5	332.4	387.8	1559.5	311.90	4998.7	510.1	504.0	551.2	527.9	482.8
	R	106.1	506.8	101.36	162.4	220.9	252.2	237.2	283.8	1156.5	231.30	235.1	256.0	273.5	310.2	361.1	1435.5	287.10	4690.7	474.1	464.8	500.7	463.1	..
	E	12.0	33.0	6.60	17.7	17.1	25.1	32.2	29.9	122.0	24.40	28.1	24.6	22.0	22.2	26.7	124.0	24.80	308.0	36.0	39.2	50.5	64.8	..

X-1, X-2, X-3, X-4, X-5, X-6, XX—Summations for the respective plan periods.

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GENERAL NOTE TO TABLES III–A–1–A, III–A–1–E and III–A–1–G

Soviet educational establishments which train secondary specialized and semiprofessional personnel are usually called technicums. Soviet statistical sources group institutions of secondary specialized training, as well as semiprofessionals who graduate from these institutions, into five training or occupational specialization categories:

1. *Engineering* technicians, which includes technicum students or trainees in—

(A) Industry and construction, such as machine building, civil, mechanical, power, mining, metallurgical, chemical, aviation, architectural, light consumer industry, and lumber industry engineering technicians.

(B) Transportation and communication, with all transportation and communication (cable and electronics) fields of engineering technicians.

2. *Agricultural,* which includes agronomy technicians, veterinary technicians; land conservation, electrification and mechanization of agriculture, and breeding technicians; forestry technicians.

3. *Socioeconomic,* which includes accounting, planning, trade, economics technicians; jurisprudence semiprofessionals such as archive workers, court clerks, etc.

4. *Educational,* which includes—

(A) Primary school (primarily elementary grade) teachers; creche and nursery school teaching personnel. Also included in this category are "cultural service specialists": librarians, club organizers, etc.

(B) Intermediate level art, music, and theatrical school specialists.

5. *Health,* which includes medical technicians, nurses, dentists, dentistry technicians, trained instructors of physical education, coaches and sports instructors.

The main groupings are identical with those for professional specialists with completed higher education. The difference, of course, is the level of training: semiprofessionals have this training on a secondary level. Thus, while an electrical engineer is included in the industrial group of professionals with higher education, an electrical engineering technician is included in the industrial group of semiprofessionals with secondary education. In other words, the distinction between professional and semiprofessional is made on the basis of the level of formal training, and the occupational specialization grouping for both remains about the same.

Data on enrollment, acceptances, and graduations are arranged in three tables: III–A–1–A, III–A–1–E, and III–A–1–G, as follows:

Table III–A–1–A.—Acceptances.—Since most entrances take place in the fall, they appear in this table under that year. Thus the 1928 figure on matriculation refers to the entering class of 1928–29, or new acceptances in 1928.

Table III–A–1–E.—Enrollment.—The table is arranged in such a way that enrollment is shown as of the *end* of a given calendar year and thus applies to the whole academic year which starts in the fall of the indicated year. Thus enrollment in 1928–29 is tabulated under the year 1928. Also, statements in official Soviet sources such as "end of 1928" or "beginning of 1929" are viewed as equivalent. Enrollment is reported by Soviet statistical agencies variously as of September 15, October 1, November 15, December 15 or December 31. Changes in enrollment between these dates and the drop in enrollment between September 15 of the preceding year and January 1 of the following year are neglected.

Table III–A–1–G.—Graduations.—Graduations usually take place in the summer and thus the figures in the table refer to graduations for that year. Thus 1928 means the graduating class of the academic year 1927–28, or graduations in 1928.

In each of these tables the grouping is as indicated in the discussion of specialization fields above. Furthermore, within each specialty branch there are three subdivisions by type of training program: T—Total; R—Regular (day and evening); and E—Extension-correspondence.

A checkerboard code is used in order to identify each place in the table. In the discussion and sources which follow, the letter-number code refers to the appropriate place in each table. This procedure avoids complicated footnotes. All tables give annual enrollments, matriculations, and graduations in thousands with accuracy to the first decimal point.

SOURCES AND NOTES TO TABLE III–A–1–A (ACCEPTANCES)

Place in Table — Sources and Discussion

1–6R a–k (28–38).—Kul't Stroi–1940, pp. 111–12.
6R a–l (28–39).—KS–1956, p. 203.
6TRE m, r–bb (40, 45–55).—KS–1956, p. 203.
6R o,p (42–43).—Vosnesenskii, *Voennaia,* p. 116.
1–6TRE m,r,w,aa,bb(40, 45, 50, 54, 55).—KS–1956, p. 236–37.
6TRE cc (56).—NKh–1957, p. 251.
1–6TRE z, cc, dd, ee (53, 56–58).—NarKhoz–1959, p. 836.
6 T ff (59).—SSSR–Tsif–1959, p. 211.
1–6 T ff (59).—NarKhoz–1960, p. 746.
6RE ff (59).—NarKhoz–1960, p. 745.
6T gg (60).—SSSR–Tsif–1960, p. 311.

SUPPLEMENT TO TABLE III–A–1–A

A comparison of the data on acceptances presented in *SPM* p. 287 (Table A–2, Appendix III), with those now appearing in Table III–A–1–A is as follows:

Acceptances in Soviet secondary specialized semiprofessional schools, 1945–55

(A comparison of new official figures with those in *SPM*)

(Figures rounded in thousands)

Year	Total		Regular		Extension	
	KS	SPM	KS	SPM	KS	SPM
1945	387.6	..	352.1	..	35.5	..
1946	433.8	..	394.2	377.0	39.6	..
1947	423.3	..	379.4	350.0	43.9	..
1948	430.9	..	359.6	360.0	71.3	..
1949	430.0	450.0	364.5	..	65.5	..
1950	426.3	450.0	365.1	..	61.2	..
1951	458.4	400.0	406.3	..	52.1	..
1952	500.0	..	440.1	..	59.9	..
1953	558.0	534.0	486.0	..	72.0	..
1954	594.8	440.0	509.5	..	85.3	..
1955	587.5	..	478.7	..	108.8	..

Source: *KS–1956,* pp. 201–04; *SPM,* p. 287 (mostly estimates).

The chief cause of the differences was a lack of sufficient data on extension-correspondence enrollment at the time of the preparation of the *SPM* manuscript.

SOURCES AND NOTES TO TABLE III–A–1–E (ENROLLMENT)

Place in Table — Sources and Discussion

7R a–l (28–39).—KS–1956, pp. 201–02.
7TRE, m,r–bb (40, 45–55).—KS–1956, pp. 201–02.
7R p (43).—Pravda, April 17, 1944, states that enrollment was about 500,000.
7R q (44).—Bol'shevik, No. 2, 1944, pp. 19–20, states that anticipated enrollment in 1944 was 204,000 over 1943 actual enrollment. Consequently 1944 enrollment was probably about 700,000.
7TRE cc (56).—Dos–1957, p. 275.
7 TRE dd (57).—SSSR–Tsif–1958, p. 353.
7 TRE ee (58).—NarKhoz–1959, p. 830.
7 TRE ff (59).—SSSR–Tsif–1959, p. 211; *NarKhoz–1960,* p. 740.

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1–6R a (28).—*Nar Khoz–1932*, pp. 512–15, *Kul't Stroi–1940*, p. 107, give a slightly lower total enrollment (6Ra—206,300), without any breakdown.

1–6R b (29).—*Nar Khoz–1932*, pp. 512–15. *Ibid.*, p. 537, gives a breakdown by year of study *(kurs)* for 1929–30. It gives a slightly different composition and a grand total of 207,100. No explanation is given, but it is apparent that the breakdown by year of study was made according to incomplete statistics *(po nepolnomu krugu otchetnosti)*. About the same total as indicated in the table was reported in *Kul't Stroi–1940*, p. 107. This source gives it as 237,500.

1–6R c (30).—The figures incorporated in the table are from *Nar Khoz–1932*, pp. 512–15. *Kul't Stroi–1934*, p. 39, gives a breakdown as follows:

c 1R.....229,100	c 5R.....43,700
c 2R.....114,500	c 7R.....593,700
c 3R.....149,800	

This distribution of students by field accounts for about 537,100, and the residual of 56,600 apparently contains socioeconomic and art students (3Rc). It is stated that the figures refer to "the end of 1930." The grouping of students in engineering, agricultural and socioeconomic segments is slightly different from that presented in the table. The figures on education and health students check. These differences are due to the classification of some engineering students as agricultural specialists (mechanization of agriculture technicians) and also due to the subtraction of *tekhnik-ekonomist* students from engineering. The grand totals reported in other sources are: *Sots Stroi–1934*, p. 406: 593,700 (same as in table); *Kul't Stroi–1940*, p. 107: 586,800 (lower than in table).

1–6R d (31).—All figures except 3Rd from *Sots Stroi–1936*, p. 573.

3R d (31).—*Podgotovka*, p. 36.

6R d (31).—There were several slightly different totals found: *Kul't Stroi–1940*, p. 107, gives the total, with no breakdowns as 747,300. *SC–Eng–1936*, p. 456; *Sots Stroi–1934*, p. 407; *Sots Stroi–1936*, p. 116, give the total as 754,100 (same as in table). It is apparent that the official grand total is somewhere between 747,000 and 754,000. Thus the discrepancy between the sum (6Rd) of breakdowns (1–5Rd) and the grand total is 25,000 to 30,000. This residual undoubtedly includes some art students.

1–6Re (32).—*Sots Stroi–1934*, p. 407. The figures in the table were accepted from this source. Other sources give slightly different breakdowns with about the same total. Beilin, *Kadry*, p. 110, gives a different breakdown for engineering and agricultural students, which again is a reflection of the classification procedures for agricultural equipment technicians. *Vtoroi FYP*, vol. I, p. 514, gives a somewhat different breakdown but the same total. *Kul't Stroi–1940*, p. 107, gives the total as only about 723,700, without any breakdown. This figure seems to be far too low as compared with those given in other sources. In this connection, it might be said that this source tries to "smooth" over the jumps and declines in enrollment in the years between 1930 and 1933.

7E e (32).—*Not on table: Itogi pervogo FYP*, pp. 218, 275, gives the total enrollment figure as 949,200, which includes correspondence students. If the actual total (6Re—797,000) is subtracted, we get about 150,000 "technicum" students who took correspondence training *(zaochniki)*. Note that during this period, courses *(kursovaia podgotovka)* were the chief form of extension training.

1–6R f (33).—*Kul't Stroi–1934*, p. 41. The figures in the table were accepted from this source. 3f is derived as a residual. *Plan 1935*, p. 687, gives the same total with a somewhat different breakdown. Finally, *Kul't Stroi–1940*, p. 107, gives the total enrollment figure of 588,900, without any breakdown. This is a slightly lower figure than that accepted in the table.

1–6Rg (34).—*Sots Stroi–1936*, p. 577. Approximately the same breakdowns and totals are given in *Kul't Stroi–1934*, pp. 46–50, and *Kul't Stroi–1935*, pp. 80–85. The latter sources, however, give detailed distribution of technicums and enrollment by *narkomat* (i.e., subordinate people's commissariats). Finally, *Kul't Stroi–1940*, p. 107, gives the total enrollment as 671,500, which is quite close to the figure accepted in the table.

1–6R h (35).—All figures in the table except 3Rh are accepted from *Plan 1937*, p. 150. Other sources *(Sots Stroi–1936*, p. 573; *Plan 1936*, vol. I, p. 459) give about the same total and breakdowns. In these sources the residual between the total of breakdowns and the official grand total ranges from about 57,000 to about 70,000. It was assumed that the socioeconomic segment accounted for about 40,000 students and therefore from 20,000 to 30,000 students remain unaccounted for, a large proportion of whom were probably enrolled in art schools.

1–6R i (36).—All figures except 3Ri are from *Plan 1937*, p. 151. This source gives the only set of figures which give a breakdown for 1936. They represent "preliminary, expected" *(ozhidaemye)* figures. *Kul't Stroi–1940*, p. 107, gives the grand total as 768,900, which, if accepted with the breakdowns from *Plan 1937*, p. 151, gives a residual of about 35,000. This residual was accepted for 3Ri. It must be observed that in this case the adjustment of figures as described above is not quite legitimate since the final total (from *Kul't Stroi–1940*, p. 107) is compared with figures for the preliminary breakdown. There seems to be no other way to handle this problem.

1–6R j (37).—*Kul't Stroi–1940*, p. 129. Census of students enrolled by field as of Sept. 15, 1937. A slightly different breakdown is given in *Tretii FYP*, p. 237; the total enrollment given in this source is about 851,000

1–6R k (38).—*Kul't Stroi–1940*, p. 129. Census of students enrolled by field as of Sept. 15, 1938. Identical breakdown and total in *Sots Stroi–1933–38*, p. 121.

1–6R l (39).—*BSE–SSSR*, col. 1229-1230; *Kul't Stroi–1940*, p. 256.

1–6T m (40).—*KS–1956*, pp. 230–31.

1–6R m (40).—*NKh–1957*, p. 254.

1–6E m (40).—By subtraction.

1–6T r (45).—*KS–1956*, pp. 230–31.

1–6T w (50).—*KS–1956*, pp. 230–31.

1–6R w (50).—*NKh–1957*, p. 254.

1–6E w (50).—By subtraction.

1–6T aa (54).—*KS–1956*, pp. 230–31.

1–6T bb (55).—*KS–1956*, pp. 230–31.

1–6R bb (55).—*NKh–1957*, p. 254.

1–6E bb (55).—By subtraction.

Supplement 1 to Table III–A–1–E

A comparison of the data on enrollments presented in *SPM*, p. 287 (Table A–2, Appendix III), with those now appearing in Table III–A–1–E is as follows:

Enrollment in Soviet secondary specialized semiprofessional schools, 1945–55

(A comparison of new official figures with those in *SPM*)

(Figures rounded in thousands)

Year (fall)	Total		Regular		Extension	
	KS	SPM	KS	SPM	KS	SPM
1945	1007.7	..	907.0	940.0	100.7	..
1946	1174.5	..	1043.6	1077.0	130.9	..
1947	1231.6	..	1079.6	1113.0	152.0	..
1948	1264.0	..	1093.5	1094.0	170.5	..
1949	1309.2	1308.0	1133.9	..	175.3	..
1950	1297.6	1298.0	1116.9	1119.0	180.7	179.0
1951	1368.9	1369.0	1200.0	..	168.9	..
1952	1477.4	1475.0	1300.7	..	176.7	..
1953	1645.5	1644.0	1446.2	..	199.3	..
1954	1838.7	1744.0	1603.7	..	235.0	..
1955	1960.4	..	1673.9	..	286.5	..

Source: *KS–1956*, pp. 201–04; *SPM*, p. 287 (mostly estimates).

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The chief cause of the differences was a lack of sufficient data on extension-correspondence enrollment at the time of the preparation of the *SPM* manuscript.

Supplement 2 to Table III–A–1–E

Enrollment statistics prior to 1928 are as follows:

Enrollment in Soviet secondary semiprofessional schools, 1914–27

(At the end of the year in thousands)

Field	1914	1920	1921	1922	1923	1924	1925	1926	1927
Engineering	..	..	..	..	43.3	42.4	46.1	46.7	41.7
Agricultural	..	..	..	..	17.7	21.9	23.9	25.1	30.0
Educational	..	..	..	..	55.8	50.2	55.9	56.8	62.7
Health	..	..	..	..	11.1	14.2	15.0	15.0	18.9
Other (unspecified, predominantly socioeconomic)	..	..	..	..	26.0	35.9	41.4	34.6	35.4
Total	57.0	70.5	123.3	132.7	153.9	164.6	182.3	178.2	188.7
Total B	54.3	..	..	121.6	149.9	164.6	181.3	180.6	189.4

SOURCES AND NOTES

For all years except Total B, figures were abstracted from Beilin, *Kadry*, pp. 60, 77. Enrollment stated in Total B is from *KS–1956*, p. 201. The differences are minor.

The grouping of enrollment by field is about the same as defined above in general note to Tables III–A–1–A, III–A–1–E, and III–A–1–G. For the years 1923–27 there is an undistributed residual which contains primarily socioeconomic field students and some art students.

SOURCES AND NOTES TO TABLE III–A–1–G (GRADUATIONS)

Place in Table — *Sources and Discussion*

1–6R a–k (28–38).—All years and all breakdowns from *Kul't Stroi–1940*, pp. 111–12.

1–6R f,k (33,38).—*Sots Stroi–1933–38*, p. 123, gives figures exactly as those selected for this table.

6R a–l (28–39).—*KS–1956*, p. 204.

1–6R l (39).—Derived as a residual (X-3 minus the sum of *l* plus *m*).

1–6TRE m,r,w,aa,bb (40,45,50,54,55).—*KS–1956*, pp. 238–39.

1–6T Z, cc,dd,ee,ff (53, 55–58).—*Nar Khoz–1959*, p. 838.

6TRE m,r bb (40, 45–55).—*KS–1956*, p. 204.

Note to 6R n–z (41–45).—*Not on table.* Graduation data for the years 1942–44 are not available. The total regular graduations (507,000) for this period are known, however, and subtracting 1941 and 1945 graduations (158,000 and 106,000 respectively), we obtain for 1942–44 the figure 243,000. If we prorate these graduations by the index of reduction of graduations the same as in higher education (see Appendix Table IV–A–1–G below), we obtain:

1942.....120,000
1943..... 53,000
1944..... 70,000

6 TRE cc (56).—*NKh–1957*, p. 276.

1–6T cc (56)—*NKh–1957*, p. 277.

1–6T dd (57).—*SSSR–Tsif–1958*, p. 355.

X–1, X–2, X–3, X–4, X–5, X–6.—*KS–1956*, p. 240.

XX.—By addition of X's.

6T ee (58).—*Pravda*, Jan. 15, 1959 (Itogi 1958), states that total graduations from higher educational establishments and technicums were 840,000. Higher education graduations were 291,000 (see Appendix Table IV–A–1–G below) and thus technicum graduations were 549,000. A slightly higher figure (2,000 more) is reported in *Vestnik statistiki*, No. 5, 1959, p. 85, which states that 1958 graduations were 551,200 (instead of 549,000 as reported in the table).

1–6T ee (58).—*NarKhoz–1959*, p. 838. Prior to the appearance of this official source, the estimate of the 1958 graduating class was made as follows. Graduating classes from technicums in 1957 and 1958 were 504,000 and 549,000 respectively (*SSSR–Tsif–1958*, p. 355; *Pravda*, Jan. 16, 1959). The 1957 composition of technicum graduates by specialty field is available as shown in the table. For 1958 the number of technicum graduates in the industrial-construction and transportation-communication branches (i.e., engineering technicians) can be derived by subtracting the number of professional graduates (94,000) from the total reported for engineers and technicians (350,000) in *Pravda*, Jan. 16, 1959, which gives the figure of 256,000 engineering technicians in 1958. The increment (45,000) of technicum graduates from 1957 to 1958 (i.e., from 504,000 to 549,000) is fully explained (accounted for) by the increment (50,500) in engineering technicians (i.e., from 205,500 to 256,000). The remainder of the 1958 graduating class by specialty field can therefore be derived by projecting the 1957 distribution of graduates in other fields upon the number of graduates in other fields in 1958 as follows:

TECHNICUM GRADUATES

Field	(A) 1957 (actual)	(B) 1959 (estimated)	(C) 1958 (actual)
Total	504,000	549,000	551,200
Less engineering	205,500	256,000	261,900
All other fields	298,500	293,000	299,300
Among which:			
Agriculture	82,800	(81,000)	96,300
Socioeconomic	41,400	(41,000)	45,200
Education	84,600	(83,000)	70,600
Health	89,700	(88,000)	77,200

It is evident from a comparison of the figures in Cols. B and C that the primary source of error in the estimate is the faulty number of graduates in the agricultural field, where the actual number of graduates was some 15,000 higher than the estimate.

1–6T ff (59).—*NarKhoz–1960*, p. 750. *SSSR–Tsif–1959*, p. 212, gives a slightly divergent set of figures which differ mostly in the decimal place. It appears that while *SSSR–Tsif–1959* gives preliminary tabulation, *NarKhoz–1960* gives final tabulation. Prior to the appearance of the data incorporated in the table, the 1959 graduating class from technicums was ascertained from the report of the Soviet Central Statistical Administration and available figures for higher education graduates as follows:

TOTAL GRADUATIONS

Branch	Higher education and technicums A Thous.	Professionals B Thous.	Semi-professionals (remainder: Col. A minus B) C Thous.
1. Eng.-ind.	360.0	106.0	254.0
2. Agricultural	125.0	34.0	91.0
4. Educational-cultural	200.0	149.0	51.0
5. Medical-health	100.0	30.0	70.0
Total: 1, 2, 4, 5	785.0	319.0	466.0
6. Reported grand total	860.0	340.0	520.0
3. (Assumed socio-economic branch)	75.0	21.0	54.0

A—*Pravda*, July 14, 1959, p. 3 (Itogi, 1st half of 1959).
B—Figures from Col. ff (59) of Table IV–A–1–G in appendix to Chapter IV.
C—Annual graduates from technicums derived by subtracting figures in Col. B from those in Col. A.

The new official set of figures differs only slightly from the above estimates.

1–6T gg (60).—*SSSR–Tsif–1960*, p. 313.

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Supplement to Table III–A–1–G

A comparison of the data on graduations presented in *SPM*, p. 287 (Table A–2, Appendix III), with those now appearing in Table III–A–1–G is as follows:

Graduations from Soviet secondary specialized semiprofessional schools, 1945–55

(A comparison of new official figures with those in *SPM*)

(Figures rounded in thousands)

Year	Total		Regular		Extension	
	KS	SPM	KS	SPM	KS	SPM
1945	118.1	..	106.2	70.0	11.9	..
1946	180.1	..	162.4	191.0	17.7	..
1947	238.0	..	220.9	230.0	17.1	..
1948	277.3	..	252.2	252.0	25.1	..
1949	269.4	272.0	237.2	242.0	32.2	30.0
1950	313.7	327.0	283.7	..	30.0	..
1951	263.2	262.0	235.1	..	28.1	..
1952	280.6	..	256.0	..	24.6	..
1953	295.5	300.0	273.5	..	22.0	..
1954	332.3	320.0	310.2	..	22.1	..
1955	387.8	350.0	361.1	..	26.7	..

Source: *KS–1956*, pp. 201–04; *SPM*, p. 287 (mostly estimates).

The chief cause of the differences was a lack of sufficient data on extension-correspondence enrollment at the time of the preparation of the *SPM* manuscript.

Table III–A–2.—*Relative proportion of women among regular full-time students in Soviet secondary semiprofessional establishments, 1927–1959*

(Percent of women enrolled in secondary semiprofessional establishments by field at the end of the given year)

	a 1927	d 1930	f 1932	g 1933	h 1934	i 1935	j 1936	k 1937	m 1940	n 1950	o 1955	p 1956	q 1957	r 1958	s 1959
1. Industrial....	9.5	25.8	28.5	30.1	29.6	26.0	26.8	25.9	32.0	35.0	42.0	39.0	37.0	34.0	33.0
2. Agricultural .	15.4	31.0	33.5	30.1	31.6	30.2	29.3	28.7	37.0	41.0	43.0	44.0	38.0	38.0	36.0
3. Socioeconomic	36.3	48.2	51.9	54.5	54.6	52.3	51.1	50.2	60.0	73.0	82.0	..	..	..	..
4. Education...	53.5	51.9	54.1	54.6	55.2	54.3	55.9	57.0	60.0	81.0	85.0	78.0	79.0	76.0	77.0
5. Health.....	89.3	87.3	85.6	80.7	79.7	76.3	79.9	83.3	83.0	85.0	89.0	89.0	86.0	84.0	83.0
6. All Fields....	37.6	38.8	44.7	43.9	44.1	43.0	46.7	51.6	55.0	54.0	55.0	52.0	48.0	47.0	46.0

Sources:
1–6, a, d, f, g—Beilin, *Kadry*, p. 367; *Sots-Stroi–1935*, p. 617; *SC-Eng–1936*, p. 457; *Sots-Stroi–1934*, p. 410.
1–6, h—*SC–Eng–1936*, p. 457; *Sots-Stroi–1936*, p. 576.
1–6, a, g, h, i, j, k—*Kul't Stroi–1940*, p. 115.
1–6, m, n, o—*NKh–1957*, p. 254; *Vestnik statistiki*, No. 6, 1956, p. 96; *KS–1956*, p. 205.
1–6, p—*Dos–1957*, p. 282.
1–6, q—*SSSR–Tsif–1958*, p. 360.
1–6, r—*NarKhoz–1959*, p. 840.
1–6, s—*NarKhoz–1960*, p. 751.

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TABLE III–A–3.—*National composition of students enrolled in Soviet secondary specialized educational establishments, selected years*

(In thousands and percent)

Nationality	1927		1950		1956		1956, RSFSR[b]		1957		1958		1959	
	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent
Russians	105.1	55.6	729.8	65.3	1077.0	64.8	1097.2	88.2	997.5	64.8	920.1	64.4	882.5	63.7
Ukrainians	21.0	11.1	160.6	14.4	249.0	15.0	41.4	3.3	232.0	15.0	214.9	15.0	211.8	15.3
Belorussians	4.5	2.4	32.9	2.9	49.5	3.0	10.6	0.9	45.5	3.1	42.0	2.9	41.9	3.2
Uzbeks	3.6	1.9	15.9	1.4	23.8	1.4	0.4	0.03	22.5	1.5	21.0	1.5	20.0	1.4
Kazakhs	2.5	1.3	9.0	0.9	17.2	1.0	1.4	0.1	17.3	1.1	18.6	1.3	19.5	1.4
Georgians	5.7	3.0	19.0	1.7	22.3	1.4	1.3	0.1	20.5	1.3	18.5	1.3	17.8	1.3
Azerbaidzhans	5.7	3.0	12.9	1.1	17.8	1.1	0.5	0.04	17.3	1.1	15.7	1.1	15.2	1.1
Lithuanians	..	..	8.3	0.8	15.6	0.9	1.3	0.1	14.7	0.9	15.5	1.1	17.8	1.3
Moldavs	0.1	0.0	5.8	0.4	7.3	0.5	0.3	0.03	6.8	0.4	6.7	0.5	8.4	0.6
Latvians	..	..	11.8	1.1	13.5	0.8	0.8	0.1	12.9	0.8	12.5	0.9	10.9	0.8
Kirgiz	0.4	0.2	3.4	0.3	3.9	0.2	0.1	negl.	4.1	0.3	4.9	0.3	4.7	0.3
Tadzhiks	0.3	0.1	4.4	0.4	5.9	0.4	0.1	negl.	5.5	0.4	5.0	0.4	4.7	0.3
Armenians	3.6	1.9	14.8	1.3	19.7	1.2	2.4	0.2	17.6	1.1	16.2	1.2	15.5	1.1
Turkomen	0.6	0.3	3.7	0.3	5.2	0.3	0.2	negl.	4.9	0.3	4.8	0.3	4.7	0.3
Estonians	..	..	9.5	0.9	10.3	0.6	0.7	0.1	9.3	0.6	8.2	0.6	8.2	0.6
Sub-total	153.1	80.8	1041.0	93.2	1538.0	92.6	1158.7	93.2	1428.4	92.7	1324.6	92.8	1283.6	92.7
Other	36.3	19.2	75.9	6.8	122.7	7.4	[a]84.9	[a]6.8	111.8	7.3	103.1	7.2	101.1	7.3
Official total of regular (day and evening students)	189.4	100.0	1116.9	100.0	1660.7	100.0	na	na	1540.2	100.0	1427.7	100.0	1384.7	100.0
Total enrollment	189.4	..	1297.6	..	2012.2	..	1243.6	100.0	1941.1	..	1875.9	..	1907.0	..

Sources and Notes: *NarKhoz–1959*, p. 841; *Dos–1957*, p. 283; *SSSR-Tsif–1958*, p. 361; *NarKhoz–1960*, p. 752.

[a] "Other" Total 1956:

	Thousands	*Percent*
	84.9	6.8
Jews	21.5	1.7
Karello-Finns	1.6	0.1
Tatars	19.4	1.5
Bashkirs	4.0	0.3
Dagestan nationalities	5.4	0.4
Buryats	1.9	0.2
Kabardins	1.2	0.1
Komi	2.3	0.2
Mari	1.8	0.1
Mordvins	3.5	0.3
Ossets	2.1	0.2
Udmurs	1.9	0.2
Chuvash	6.1	0.5
Yakuts	2.0	0.2
All other unspecified)	10.2	0.8

[b] Note that distribution of students in RSFSR is for *total* enrollment, while for the U.S.S.R. (all years) it is for regular students only.

APPENDIX III–B–1.—*Specialties offered in Soviet semiprofessional schools as of 1959*

Introductory Note

The Ministry of Higher Education establishes definitions and descriptions of specialities for all Soviet semiprofessional schools (technicums) in which training may be offered. Individual specialties (*spetsial'nosti*) are grouped into specialty groups and specialty branches (see discussion in the text, Ch. III).

Each specialty is designated by a decimal classification code, by which students and subsequently graduates are identified. Listed below is the roster of specialties in semiprofessional schools by specialties, specialty groups and branches with the appropriate decimal code identification. The original data were compiled from *Sprav SSU–1958, passim*. The information was subsequently verified from the listing in *SSO*, No. 5, 1959, pp. 50–63, which, in addition to the names of specialties, gave the decimal code classification system, and also indicated what kind of skilled worker's occupation technicum students could acquire as a result of their production and applied training in the respective specialties. (This latter information is, however, omitted in this appendix, for it is largely not relevant for the identification of specialties.)

On the basis of these two rosters, a final check of

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specialties was made with *Sprav SSU–1959, passim.* The specialties for which an official decimal code number was not found have been listed under the appropriate specialty group with the first two digit numbers followed by two letters (i.e., 17XY, 17XZ, etc.). Wherever the specialty code or designation of specialty was not known exactly, this has been appropriately indicated.

BRANCH I.–INDUSTRIAL-TECHNICAL

SPECIALTY GROUP 0100.–Geology and Exploration of Mineral deposits (*Geologiia i razvedka mestorozhdenii poleznykh iskopaemykh*)

0101–Geology and exploration of mineral deposits (*Geologiia i razvedka mestorozhdenii poleznykh iskopaemykh*)
0102–Geology and exploration of petroleum and natural gas deposits (*Geologiia i razvedka neftianykh i gazovykh mestorozhdenii*)
0103–Geophysical methods of surveying and exploration of mineral deposits (*Geofizicheskie metody poiskov i razvedki mestorozhdenii poleznykh iskopaemykh*)
0104–Industrial geophysics (*Promyslovaia geofizika*)
0105–Hydrogeology and engineering geology (*Gidrogeologiia i inzhenernaia geologiia*)
0106–Exploratory drilling (*Razvedochnoe burenie*)

SPECIALTY GROUP 0200.–Exploitation of Mineral Deposits (*Razrabotka mestorozhdenii poleznykh iskopaemykh*)

0201–Mine surveying (*Marksheiderskoe delo*)
0202–Exploitation of ore and placer deposits (*Razrabotka rudnykh i rossypnykh mestorozhdenii*)
0203–Underground mining of coal deposits (*Podzemnaia razrabotka ugol'nykh mestorozhdenii*)
0204–Open cut mining of coal and rock minerals (*Otkrytaia razrabotka ugol'nykh i nerudnykh mestorozhdenii*)
0205–Exploitation of peat deposits (*Razrabotka torfianykh mestorozhdenii*)
0206–Ore concentration (*Obogashchenie rud*)
0207–Benefication of rock minerals (*Obogashchenie nerudnykh iskopaemykh*)
0208–Coal benefication and briquetting (*Obogashchenie i briketirovanie uglia*)
0209–Drilling of oil and gas wells (*Burenie neftianykh i gazovykh mestorozhdenii*)
0210–Exploitation of oil and gas wells (*Ekspluatatsiia neftianykh i gazovykh skvazhin*)
0211–Construction of mining enterprises (*Stroitel'stvo gornykh predpriiatii*)

SPECIALTY GROUP 0300.–Power Engineering (*Energetika*)

0301–Electric power stations, networks and grids (*Elektricheskie stantsii, seti i sistemy*)
0302–Relay protective and automatic devices of electric power grids (*Releinaia zashchita i avtomatika energosistem*)
0303–Electric equipment of industrial enterprises (*Elektrooborudovanie promyshlennykh predpriiatii*)
0304–Electric equipment of lumber camps (*Elektrooborudovanie lesozagotovok*)
0305–Electric equipment of ships (*Elektrooborudovanie sudov*)
(0306)–Not known
0307–Electromechanical equipment of civilian construction and communal enterprises (*Elektromekhanicheskoe oborudovanie grazhdanskikh zdanii i kommunal'nykh predpriiatii*)
0308–Mining electromechanics (*Gornaia elektromekhanika*)
0309–Boiler house, steam-turbine installations, and automatics of thermal processes of electric power stations (*Kotel'nye, paroturbinnye ustanovki i avtomatika teplovykh protsessov na elektrostantsiiakh*)
0310–Electric thermotechnical measuring (*Elektroteplotekhnicheskie izmereniia*)
0311–Technology of water, fuel, and lubricating materials (*Tekhnologiia vody, topliva i smazochnykh materialov*)
0312–Assembling and exploitation of hydrotechnical installations (*Montazh i ekspluatatsiia gidrotekhnicheskikh ustanovok*)
0313–Thermo technics of gas-fired furnaces (*Gazopechnaia teplotekhnika*)
0314–Thermotechnical equipment of industrial enterprises (*Teplotekhnicheskoe oborudovanie promyshlennykh predpriiatii*)
0315–Construction of electric transmission lines (*Stroitel'stvo linii elektroperedach'*)

SPECIALTY GROUP 0400.–Metallurgy (*Metallurgiia*)

0401–Blast furnace production (*Domennoe proizvodstvo*)
0402–Production of steel (*Proizvodstvo stali*)
0403–Electric metallurgy of steel and iron alloys (*Elektrometallurgiia stali i ferrosplavov*)
0404–Metallurgy of heavy non-ferrous metals (*Metallurgiia tiazhelykh tsvetnykh metallov*)
0405–Metallurgy of light-weight metals (*Metallurgiia legkikh metallov*)
0406–Metallurgy of rare metals and production of hard alloys (*Metallurgiia redkikh metallov i proizvostvo tverdykh splavov*)
0407–Dust collecting and cleaning of technological and ventilation gases (*Pyleulavlivanie i ochistka tekhnologicheskikh i ventiliatsionnykh gazov*)
0408–Casting of ferrous metals (*Liteinoe proizvodstvo chernykh metallov*)
0409–Production of alloys and casting of non-ferrous metals (*Proizvodstvo splavov i lit'e tsvetnykh metallov*)
0410–Profile casting of non-ferrous metals and alloys (*Fasonnoe lit'e tsvetnykh metallov i splavov*)
0411–Metallography and thermal processing of metals (*Metallovedenie i termicheskaia obrabotka metallov*)
0412–Metal rolling production (*Prokatnoe proizvodstvo*)
0413–Pipe production (*Trubnoe proizvodstvo*)
0414–Wire and cable production (*Provolochnoe i kanatnoe proizvodstvo*)
0415–Forging die production (*Kovochno-shtampovoe proizvodstvo*)
0416–Processing of non-ferrous metals and alloys under pressure (*Obrabotka tsvetnykh metallov i splavov davleniem*)
04XX–Non-metallic protective coatings (*Nemetallicheskie zashchitnye pokrytiia*)

SPECIALTY GROUP 0500. Machine Building and Instrument Construction (*Mashinostroenie i priborostroenie*)

0501–Processing of metals by cutting (*Obrabotka metallov rezaniem*)
0502–Metal processing machines (*Metalloobrabatyvaiushchie stanki*)
0503–Installation and repair of machine equipment (*Montazh i remont stanochnogo oborudovaniia*)
0504–Tool production (*Instrumental'noe proizvodstvo*)
0505–Production of abrasive tools (*Proizvodstvo abrazivnogo instrumenta*)
0506–Forging and pressing in machine building (*Kuznechno pressovoe mashinostroenie*)
0507–Welding production (*Svarochnoe proizvodstvo*)
0508–Metallurgical machine-building (*Metallurgicheskoe mashinostroenie*)
0509–Equipment of metallurgical factories (*Oborudovanie metallurgicheskikh zavodov*)
0510–Installation and repair of industrial equipment (*Montazh i remont promyshlennogo oborudovaniia*)
0511–Mining machine building (*Gornoe mashinostroenie*)
0512–Geologic prospecting equipment and instruments (*Geologo–razvedochnoe oborudovanie i apparatura*)
0513–Equipment of petroleum and natural gas fields (*Oborudovanie neftianykh i gazovykh promyslov*)
0514–Transport and tankage of petroleum and natural gas (*Transport i khranenie nefti i gaza*)
0515–Agricultural machine building (*Sel'skokhoziaistvennoe mashinostroenie*)

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0516—Lifting, hoisting and transportation machinery building) (*Pod'emno-transportnoe mashinostroenie*)
0517—Construction and road machinery building (*Stroitel'noe i dorozhnoe mashinostroenie*)
0518a—Repair and exploitation of road machinery and its equipment (*Remont i ekspluatatsiia dorozhnykh mashin i oborudovaniia*)
0518—Construction and road machines and equipment (*Stroitel'nye i dorozhnye mashiny i oborudovanie*)
0519—Track and construction machines of railroad transportation (*Putevye i stroitel'nye mashiny zheleznodorozhnogo transporta*)
0520—Railway car building (*Vagonostroenie*)
0521—Automobile construction (*Avtomobilestroenie*)
0522—Tractor construction (*Traktorostroenie*)
0523—Motorcycle construction (*Mototsiklostroenie*)
0524—Ship hull construction (*Sudokorpusostroenie*)
0525—Ship repair (*Sudoremont*)
0526—Machinery and mechanisms of the technical fleet (*Mashiny i mekhanizmy tekhnicheskogo flota*)
0527—Printing machinery construction (*Poligraficheskoe mashinostroenie*)
0528—Printing industry equipment (*Oborudovanie poligraficheskoi promyshlennosti*)
0529—Chemical machinery building (*Khimicheskoe mashinostroenie*)
0530—Oxygen machinery and apparatus (*Kislorodnye mashiny i apparaty*)
0531—Equipment of chemical plants (*Oborudovanie khimicheskikh zavodov*)
0532—Equipment of coke-chemical plants (*Oborudovanie koksokhimicheskikh zavodov*)
0533—Equipment of petroleum and gas processing plants (*Oborudovanie neftegazopererabatyvaiushchikh zavodov*)
0534—Machinebuilding of building materials industry (*Mashinostroenie promyshlennosti stroitel'nykh materialov*)
0535—Equipment of building materials industry (*Oborudovanie promyshlennosti stroitel'nykh materialov*)
0536—Equipment of glass factories (*Oborudovanie stekol'nykh zavodov*)
0537—Equipment of plants of refractory industry (*Oborudovanie zavodov ogneupornoi promyshlennosti*)
0538—Equipment of plants of cellulose—paper and dendrochemistry industries (*Oborudovanie predpriiatii tselliulozno-bumazhnoi i lesokhimicheskoi promyshlennosti*)
0539—Machine building of food industry (*Mashinostroenie pishchevoi promyshlennosti*)
0540—Equipment of plants of food industry (*Oborudovanie predpriiatii pishchevoi promyshlennosti*)
0541—Equipment of elevators, mills and warehouses (*Oborudovanie elevatorov, mel'nits i skladov*)
0542—Equipment of plants of meat and milk industries (*Oborudovanie predpriiatii miasnoi i molochnoi promyshlennosti*)
0543—Equipment of plants of fish industry (*Oborudovanie predpriiatii rybnoi promyshlennosti*)
0544—Equipment for enterprises in trade and public catering (*Oborudovanie predpriiatii torgovli i obshchestvennogo pitaniia*)
0545—Building of textile machinery (*Tekstil'noe mashinostroenie*)
0546—Equipment of plants of artificial fiber (*Oborudovanie predpriiatii iskusstvennogo volokna*)
0547—Equipment of hosiery factories (*Oborudovanie trikotazhnykh fabrik*)
0548—Equipment of sewing machine plants (*Oborudovanie shveinykh fabrik*)
0549—Equipment of plants of leather and fur industry (*Oborudovanie predpriiatii kozhevnoi i mekhovoi promyshlennosti*)
0550—Equipment of plants of leather substitutes (*Oborudovanie predpriiatii zamenitelei kozhi*)
0551—Equipment of footwear factories (*Oborudovanie obuvnykh fabrik*)
0552—Equipment of factories of wood-processing industry (*Oborudovanie predpriiatii derevo-obrabatyvaiushchei promyshlennosti*)
0553—Equipment of lumber industry (*Oborudovanie lesozagotovitel'nykh predpriiatii*)
0554—Equipment of timber rafting (*Oborudovanie lesosplava*)
0555—Boiler construction (*Kotlostroenie*)
0556—Turbine construction (*Turbinostroenie*)
0557—Internal combustion engines (*Dvigateli vnutrennego zgoraniia*)
0558—Ship engines and mechanisms (*Sudovye mashiny i mekhanizmy*)
0559—Ship power installations (*Sudovye silovye ustanovki*)
0560—Locomotive building (*Lokomotivostroenie*)
0561—Locomobile building (*Lokomobilestroenie*)
(0562)—Not known
0563—Machine building for hydrotechnical installations (*Gidromashinostroenie*)
0564—Refrigeration and compressor machinery building (*Kholodil'noe i kompressornoe mashinostroenie*)
0565—Refrigeration and compressor machinery and installations (*Kholodil'no-kompressornye mashiny i ustanovki*)
0566—Refrigeration industry (*Kholodil'noe khoziaistvo*)
0567—Production of control & measuring devices and instruments (*Proizvodstvo kontrol'no-izmeritel'nykh priborov i instrumentov*)
0568—Production of timing devices (*Proizvodstvo priborov vremeni*)
0569—Mechanical measuring (*Mekhanicheskie izmereniia*)
0570—Production of medical apparatus and instruments (*Proizvodstvo meditsinskikh priborov i instrumentov*)
0571—Equipment of factories of medical industry (*Oborudovanie predpriiatii meditsinskoi promyshlennosti*)
0572—Production of machines and instruments for mechanical testing (*Proizvodstvo mashin i priborov dlia mekhanicheskikh ispytanii*)
(0573)—Not known
0574—Mechanization of communication industry (*Mekhanizatsiia predpriiatii sviazi*)
0575—Equipment of cinematographic installations (*Oborudovanie kinoustanovok*)
(0576)—Not known
0577—Aircraft construction (*Samoletostroenie*)
0578—Aircraft testing (*Ispytanie samoletov*)
0579—Technical exploitation of aircraft and aircraft propulsion devices (*Tekhnicheskaia ekspluatatsiia samoletov i aviadvigatelei*)
(0580–0581)—Not known
0582—Aircraft engines and propulsion devices (*Aviatsionnye dvigateli*)
(0583–0596)—Not known
0597—Optical-mechanical instruments (*Optikomekhanicheskie pribory*)

NOTE.—When the number of specialties in the decimal code exceeds 99, the numbers continue with 100, etc., thus adding an extra digit to the decimal code.

05101—Equipment and technology of textile industry *Oborudovanie i tekhnologiia tekstil'nogo proizvodstva*)
05102—Equipment and technology of textile industry for initial processing of textile raw material (*Oborudovanie i tekhnologiia proizvodstva po pervichnoi obrabotke tekstil'nogo syr'ia*)
05103—Equipment of finishing factories (*Oborudovanie otdelochnykh fabrik*)
05XX—Precision instrument building (*Tochnoe priborostroenie*)
05XY—Diesel engine construction (*Dizelestroenie*)

SPECIALTY GROUP: 0600. Electrical Machine Building and Electrical Instrument Construction (*Elektromashinostroenie i elektropriborostroenie*)

0601—Electrical machine building (*Elektromashinostroenie*)
0602—Electrical equipment building (*Elektroapparatostroenie*)
0603—Equipment manufacturing for wire communication systems (*Apparatostroenie provodnoi sviazi*)

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0604—Electrical instrument construction (*Elektropriborostroenie*)
0605—Electrical equipment of automobiles and tractors (*Avtotraktornoe elektrooborudovanie*)
0606—Production of cables and wires (*Proizvodstvo kabelei i provodov*)
0607—Production of electric insulation materials (*Proizvodstvo elektroizoliatsionnykh materialov*)
0608—Electro-vacuum instrument construction (*Elektrovakuumnoe priborostroenie*)
0609—Equipment of electro-vacuum production (*Oborudovanie elektrovakuumnogo proizvodstva*)
0610—Production of automatic and telemechanic instruments (*Proizvodstvo apparatury avtomatiki i telemekhaniki*)
0611—Controlling-measuring and regulating instruments (*Kontrol'noizmeritel'nye i regularuiushchie pribory*)
0612—Production of electric and mathematic machines (*Proizvodstvo elektricheskikh i matematicheskikh mashin*)
0613—Production of adding machines and adding-analytical machines (*Proizvodstvo schetnykh i schetno-analiticheskikh mashin*)
0614—Installation and repair of X-ray and electric medical equipment (*Montazh i remont rentgenovskoi i elektromeditsinskoi apparatury*)
0615—Aircraft instrument construction (*Aviapriborostroenie*)
0616—Exploitation of aircraft instruments and electric equipment (*Ekspluatatsiia aviatsionnykh priborov i elektrooborudovaniia*)
0617—Production of aircraft electric equipment (*Proizvodstvo aviatsionnogo elektrooborudovaniia*)
0618—Technical exploitation of ground equipment for aircraft navigation and landing (*Tekhnicheskaia ekspluatatsiia nazemnykh radiosredstv samoletovozhdeniia i posadki*)
0619—Technical exploitation of radio equipment of aircrafts (*Tekhicheskaia ekspluatatsiia radiooborudovaniia samoletov*)
(0620)—Not known
0621—Gyroscopic instruments (*Giroskopicheskie pribory*)
0622—Instruments of electronic microscopy (*Pribory elektronnoi mikroskopii*)
06XX—Optical mechanical instruments (*Optikomekhanicheskie pribory*)

SPECIALTY GROUP: 0700. Radio Engineering and Communications (*Radiotekhnika i sviaz'*)

0701—Radio communications and broadcasting (*Radiosviaz' i radioveshchanie*)
0702—Ship radio communication and electro radio navigation (*Sudovaia radiosviaz' i elektroradionavigatsiia*)
0703—Broadcasting (*Radioveshchanie*)
0704—Radio equipment construction (*Radioapparatostroenie*)
0705—Production of radio insulation materials and radio components (*Proizvodstvo radioizoliatsionnykh materialov i radiodetalei*)
0706—Television engineering and radio communication networks (*Televisionnaia tekhnika i radioreleinaia sviaz'*)
0707—Wire communication (*Provodnaia sviaz'*)
0708—Regional electrical communications and radio broadcasting installations (*Raionnaia elektricheskaia sviaz' i radiofikatsiia*)
0709—Line and cable equipment of communications systems (*Lineino-kabel'nye sooruzheniia sviazi*)
1710—Mail communication (*Pochtovaia sviaz'*)
0711—Radar and radio-location devices (*Radiolokatsionnye ustroistva*)
0712—Radiotechnical measurements (*Radiotekhnicheskie izmereniia*)
0713—Installation of radio electric equipment of aircrafts (*Montazh radioelektrooborudovaniia samoletov*)

SPECIALTY GROUP: 0800. Chemical Technology (*Khimicheskaia tekhnologiia*)

0801—Technology of petroleum, natural gas and artificial liquid fuel (*Tekhnologiia nefti, gaza i iskusstvennogo zhidkogo topliva*)
0802—Technology of coke-chemical production (*Tekhnologiia koksokhimicheskogo proizvodstva*)
0803—Technology of non-organic compounds (*Tekhnologiia neorganicheskikh veshchestv*)
0804—Production of alumina (*Proisvodstvo glinozema*)
0805—Technology of electrochemical production (*Tekhnologiia elektrokhimicheskikh proizvodstv*)
0806—Production of electrodes (*Proizvodstvo elektrodov*)
0807—Electrochemical coatings (*Elektrokhimicheskie pokrytiia*)
0808—Technology of silicates (*Tekhnologiia silikatov*)
0809—Technology of refractory materials (*Tekhnologiia ogneupornykh materialov*)
0810—Technology of organic synthesis and synthetic rubber (*Tekhnologiia organicheskogo sinteza i sinteticheskogo kauchuka*)
0811—Technology of organic dyes and intermediate products (*Tekhnologiia organicheskikh krasitelei i promezhutochnykh produktov*)
0812—Synthetic aromatic compounds (perfume) production (*Parfiumerno-sinteticheskoe proizvodstvo*)
0813—Technology of plastics (*Tekhnologiia plasticheskikh mass*)
0814—Technology of varnishes and paints (*Tekhnologiia lakov i krasok*)
0815—Non-metallic protective coatings (*Nemetallicheskie zashchitnye pokrytiia*)
0816—Technology of rubber (*Tekhnologiia reziny*)
0817—Technology of cinematographic photographic materials (*Tekhnologiia kinofotomaterialov*)
0818—Analytical chemistry (*Analiticheskaia khimiia*)
08XX—Technology of chemical-pharmaceutical preparations and antibiotics (*Tekhnologiia khimiko-farmatsevticheskikh preparatov i antibiotikov*)
08XY—Production of synthetic fibers (*Proizvodstvo iskusstvennogo volokna*)

SPECIALTY GROUP: 0900: Timber Engineering and Technology of Wood Processing, Cellulose, and Paper Manufacturing (*Lesoinzhenernoe delo i tekhnologiia drevesiny, tselliulozy i bumagi*)

0901—Technology of timber collecting (*Tekhnologiia lesozagotovok*)
0902—Rafting of timber (*Splav lesa*)
0903—Cabinet-making, furniture production (*Stoliarnomebel'noe proizvodstvo*)
0904—Sawmill-timber processing industry (*Lesopil'no-derevoobrabatyvaiushchee proizvodstvo*)
0905—Match production (*Spichechnoe proizvodstvo*)
0906—Veneer production (*Fanernoe proizvodstvo*)
0907—Dendro-chemical production (*Lesokhimicheskoe proizvodstvo*)
0908—Hydrolysis and sulphite-alcohol production (*Gidroliznoe i sul'fitno-spirtnoe proizvodstvo*)
0909—Cellulose and paper manufacturing (*Tselliulozno-bumazhnoe proizvodstvo*)
09XX—Mechanical processing of wood pulp (*Mekhanicheskaia obrabotka drevesiny*)

SPECIALTY GROUP: 1000: Technology of Food Products Industry (*Tekhnologiia prodovol'stvennykh produktov*)

1001—Flour and grain milling and enriched fodder production (*Mukomol'no-krupnoe i kombikormovoe proizvodstvo*)
1002—Storage of grain and its processing products (*Khranenie zerna i produktov ego pererabotki*)
1003—Bread-baking industry (*Khlebopekarnoe proizvodstvo*)
1004—Bakery goods industry (*Konditerskoe proizvodstvo*)
1005—Technology of sugar and sugar products (*Tekhnologiia sakharistykh veshchestv*)
1006—Brewing industry (*Brodil'noe proizvodstvo*)
1007—Technology of wine-making (*Tekhnologiia vinodeliia*)
1008—Technology of vegetable fats (*Tekhnologiia rastitel'nykh zhirov*)
1009—Technology of preserved and canned goods (*Tekhnologiia konservirovaniia*)
1010—Technology of tobacco (*Tekhnologiia tobako*)

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1011—Technology of tea (*Tekhnologiia chaia*)
1012—Technology of meat and poultry products (*Tekhnologiia miasnykh i ptitseproduktov*)
1013—Technology of dairy products (*Tekhnologiia molochnykh produktov*)
1014—Fats processing (*Zhiropererabotka*)
1015—Technology of fish products (*Tekhnologiia rybnykh produktov*)
1016—Technology of food preparation (*Tekhnologiia prigotovleniia pishchi*)
1017—Industrial fisheries (*Promyshlennoe rybolovstvo*)
1018—Ichthiology and fishing (*Ikhtiologiia i rybolovstvo*)
10XX—Maritime fishing (*Morskoe rybolovstvo*)

SPECIALTY GROUP: 1100: Technology of Consumer Goods Industry (*Tekhnologiia tovarov shirokogo potrebleniia*)

(1101–1102)—Not known
1103—Primary processing and sorting of wool (*Pervichnaia obrabotka i sortirovka shersti*)
1104—Silk cocoon winding and twining (*Kokonomotanie i shelkokruchenie*)
1107—Garment-hosiery production (*Trikotazhno-shveinoe proizvodstvo*)
1108—Compressed fiber and felt products manufacturing (*Val'ial'no-voilochnoe i fetrovoe proizvodstvo*)
1109—Cloth finishing (*Otdelka tkanei*)
1110—Finishing of hosiery products (*Otdelka trikotazhnykh izdelii*)
1111—Technology of synthetic fibers (*Tekhnologiia iskusstvennogo volokna*)
1112—Garment industry (*Shveinoe proizvodstvo*)
1113—Production of fur and fur garments (*Proizvodstvo mekhovykh i ovchinno-shubnykh izdelii*)
1114—Primary processing of leather raw material (*Pervichnaia obrabotka kozhevnogo syr'ia*)
1115—Technology of leather and tanning extracts (*Tekhnologiia kozhi i dubil'nykh ekstraktov*)
1116—Technology of furs (*Tekhnologiia mekha*)
1117—Technology of leather substitutes (*Tekhnologiia zamenitelei kozhi*)
1118—Technology of leather products (*Tekhnologiia izdelii iz kozhi*)
1119—Technology of glass products (*Tekhnologiia izdelii iz stekla*)
1120—Porcelaine and faience production (*Farforo-faiansovoe proizvodstvo*)
1121—Production and artistic finishing of toys (*Proizvodstvo i artisticheskoe oformlenie igrushki*)
1122—Production of musical instruments (*Proizvodstvo muzykal'nykh instrumentov*)
1123—Technology of raised printing and engraving (*Tekhnologiia vysokoi pechati*)
(1124)—Not known
1125—Technology of flat (ordinary) printing (*Tekhnologiia ploskoi pechati*)
1126—Technology of bookbinding (*Tekhnologiia broshiurochno-perepletnogo proizvodstva*)
1127—Technology of photomechanical processes (*Tekhnologiia fotomekhanicheskikh protsessov*)
11XX—Production of footwear (*Obuvnoe proizvodstvo*)

SPECIALTY GROUP: 1200. Construction (*Stroitel'stvo*)

1201—Architecture (*Arkhitektura*)
1202—Industrial and civil construction (*Promyshlennoe i grazhdanskoe stroitel'stvo*)
1203—Hydrotechnical construction (*Gidrotekhnicheskoe stroitel'stvo*)
(1204)—Not known
1205—Construction of rural hydro-electric stations and hydromelioration (*Stroitel'stvo sel'skikh gidroelektrostantsii i gidromelioratsiia*)
1206—Tree and garden planting in city parks and urban localities (*Ozelenenie gorodov i naselennykh punktov*)
1207—Production of construction components and products (*Proizvodstvo stroitel'nykh detalei i izdelii*)
1208—Production and installation of steel structures (*Izgotovlenie i montazh stal'nykh konstruktsii*)
1209—Production and installation of reinforced concrete structures (*Izgotovlenie i montazh zhelezobetonnykh konstruktsii*)
1210—Urban gas facilities (*Gorodskoe gazovoe khoziaistvo*)
1211—Water supply, sewerage systems and purification of industrial and sewage waters (*Vodosnabzhenie, kanalizatsiia i ochistka promyshlennykh i stochnykh vod*)
1212—Sanitary-technical installations in buildings (*Sanitarno-tekhnicheskoe ustroistvo zdanii*)
1214—Construction and exploitation of railroads (*Stroitel'stvo i ekspluatatsiia putevogo khoziaistva*)
1215—Construction and exploitation of urban roads and intrafactory roads (*Stroitel'stvo i ekspluatatsiia gorodskikh putei soobshcheniia i vnutrizavodskikh dorog*)
1216—Construction and exploitation of automobile roads and bridges (*Stroitel'stvo i ekspluatatsiia avtomobil'nykh dorog i mostov*)
1217—Construction of timber-hauling roads (*Stroitel'stvo lesovoznykh dorog*)
1218—Construction of tunnels and subways (*Stroitel'stvo tonnelei i metropolitena*)
1219—Railroad bridges and other artificial constructions (*Zheleznodorozhnye mosty i drugie iskusstvennye sooruzheniia*)

SPECIALTY GROUP: 1300.—Geodesy and Cartography (*Geodeziia i kartografiia*)

1301—Geodesy (*Geodeziia*)
(1302–1305)—Not known
1306—Topography (*Topografiia*)
13XX—Geodesy in construction (*Geodeziia v stroitel'stve*)
13XY—Aerophotogrammetry (*Aerofotogrammetriia*)
13XZ—Air photography (*Aerofotos'emka*)

SPECIALTY GROUP: 1400.—Hydrology and Meteorology (*Gidrologiia i meteorologiia*)

14XX—Meteorology (*Meteorologiia*)
14XY—Oceanography (*Okeanologiia*)
14XZ—Agricultural meteorology (*Agrometeorologiia*)
14YX—Hydrotechnical surveying (*Gidrotekhnicheskie izyskaniia*)
14YY—Hydrology of land (*Gidrologiia sushi*)
14YZ—Aerology (*Aerologiia*)

SPECIALTY GROUP: 1600.—Transportation (*Transport*)

1601—Steam locomotives (*Parovoznoe khoziaistvo*)
1602—Diesel locomotives (*Teplovoznoe khoziastvo*)
1603—Railroad cars (*Vagonnoe khoziastvo*)
1604—Rolling stock of industrial railroad transport (*Podvizhnoi sostav promyshlennogo zheleznodorozhnogo transporta*)
1605—Electromotive transportation equipment (*Elektropodvizhnoi sostav*)
1606—Power supply and electrical power equipment of railroads (*Energosnabzhenie i energeticheskoe khoziaistvo zheleznodorozhnogo transporta*)
1607—Automatics and telemechanics in railroad transportation (*Avtomatika i telemekhanika na zheleznodorozhnom transporte*)
1608—Exploitation of railroads (*Ekspluatatsiia zheleznykh dorog*)
1609—Exploitation of industrial railroad transportation (*Ekspluatatsiia promyshlennogo zheleznodorozhnogo transporta*)
1610—Mechanization of loading (*Mekhanizatsiia gruzovykh rabot*)
1611—Exploitation, repair and power supply of urban electric transportation (*Ekspluatatsiia, remont i energosnabzhenie gorodskogo elektrotransporta*)
1612—Maritime navigation (*Morskoe sudovozhdenie*)
1613—Internal waterway navigation (*Sudovozhdenie na vnutrennikh vodnykh putiakh*)
1614—Waterway communication (*Vodnye puti soobshcheniia*)

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1615—Exploitation of waterway transportation (*Ekspluatatsiia vodnogo transporta*)
1616—River and harbor dredging and operation of engineering ships (*Dnouglubitel'nye raboty i sudovozhdenie tekhnicheskogo flota*)
1617—Exploitation and repair of automobile transportation (*Ekspluatatsiia i remont avtomobil'nogo transporta*)
1618—Flight exploitation of aircrafts (*Letnaia ekspluatatsiia samoletov*)
1619—Aircraft pilotage (*Samoletovozhdenie*)
16XX—Transportation and storage of petroleum and natural gas (*Transport i khranenie nefti i gaza*)

BRANCH II.—AGRICULTURE AND FORESTRY

Specialty Group 1500.—Agriculture (*Sel'skoe khoziaistvo*)
1501—Agronomy (*Agronomiia*)
1502—Fruit and vegetable growing (*Plodoovoshchevodstvo*)
1503—Sericulture (*Shelkovodstvo*)
1504—Zootechnics (*Zootekhniia*)
1505—Hunting and game preservation (*Okhotovedenie i zverovodstvo*)
1506—Veterinary medicine (*Veterinariia*)
(1507)—Not known
1508—Mechanization of agriculture and forestry (*Mekhanizatsiia sel'skogo i lesnogo khoziaistva*)
1509—Electrification of agriculture (*Elektrifikatsiia sel'skogo khoziaistva*)
1510—Forestry (*Lesnoe khoziaistvo*)
1511—Zooveterinary medicine (*Zooveterinariia*)
15XX—Field agriculture (*Polevodstvo*)
15XY—Organization of land exploitation (*Zemleustroistvo*)

BRANCH III.—SOCIO-ECONOMIC

Specialty Group 1700.—Economics (*Ekonomika*)
(1701–1717)—Not known (identified below under 17XX *et seq.*)
1718—Merchandizing of industrial goods (*Tovarovedenie promyshlennykh tovarov*)
1719—Merchandizing of food products (*Tovarovedenie prodovol'stvennykh tovarov*)
1720—Merchandizing of industrial goods and food products (for *Tsentrosoiuz*) (*Tovarovedenie promyshlennykh i prodovol'stvennykh tovarov*) (*dlia Tsentrosoiuza*)
1721—Merchandizing of books and cultural goods (*Tovarovedenie knigi i kul'ttovarov*)
1722—Merchandizing of animal and fur materials (*Tovarovedenie zhivotnogo i pushno-mekhovogo syr'ia*)
17XX—Planning of material and food reserves and procurement of agricultural products (*Planirovanie material'nykh i prodovol'stvennykh rezervov i zagotovok produktov sel'skogo khoziaistva*)
17XY—Planning in timber collecting plants (*Planirovanie na lesozagotovitel'nykh predpriiatiakh*)
17XZ—Planning in mining industry plants (*Planirovanie na predpriiatiakh gornoi promyshlennosti*)
17YX—Planning in light industry plants (*Planirovanie na predpriiatiakh legkoi promyshlennosti*)
17YY—Planning in machine building industry plants (*Planirovanie na predpriiatiakh mashinostroitel'noi promyshlennosti*)
17YZ—Planning in plants of local industry and in industrial cooperatives (*Planirovanie na predpriiatiakh mestnoi promyshlennosti i promkooperatsii*)
17ZX—Planning in plants of metallurgical and chemical industry (*Planirovanie na predpriiatiakh metallurgicheskoi i khimicheskoi promyshlennosti*)
17ZY—Planning in plants of petroleum and natural gas industry (*Planirovanie na predpriiatiakh neftianoi i gazovoi promyshlennosti*)
17ZZ—Planning in plants of food industry (*Planirovanie na predpriiatiakh pishchevoi promyshlennosti*)
17PP—Planning in communication (*Planirovanie na predpriiatiakh sviazi*)
17PQ—Planning in plants of cellulose-paper and timber-processing industry (*Planirovanie na predpriiatiakh tsellulozno-bumazhnoi i derevo-obrabatyvaiushchei promyshlennosti*)
17PR—Planning in Soviet trade (*Planirovanie v sovetskoi torgovle*)
17PS—Planning in construction (*Planirovanie v stroitel'stve*)
17PT—Material-technical supply and distribution (*Material'no-tekhnicheskoe snabzhenie i sbyt*)
17PU—Merchandising (*Tovarovedenie*)
17PV—Merchandising in material-technical supply and distribution (*Tovarovedenie material'no-tekhnicheskogo snabzheniia i sbyta*)
17PW—Merchandising of textile raw-material (*Tovarovedenie tekstil'nogo syr'ia*)
17PX—Accounting (*Bukhgalterskii uchet*)
17PY—Accounting in trade (*Bukhgalterskii uchet v torgovle*)
17PZ—Money circulation and credit (*Denezhnoe obrashchenie i kredit*)
17QQ—Accounting and operational technique in State bank (*Uchet i operativnaia tekhnika v Gosbanke*)
17QR—State budget (*Gosudarstvennyi biudzhet*)
17QS—Financing and crediting of capital construction (*Finansirovanie i kreditovanie kapital'nogo stroitel'stva*)
17QT—Statistics (*Statistika*)

BRANCH IV.—MEDICAL AND HEALTH

Specialty Group 1900.—Medicine and Public Health (*Zdravookhranenie*)
1908—Production of prosthetic appliances (*Proteznoe proizvodstvo*)
19XX—Midwife (*Akusherskaia spetsial'nost'*)
19XY—Medical aide (*Fel'dsherskaia*)
19XZ—Medical nurse-laboratory-technician (*Fel'dsherskolaborantskaia*)
19YX—Public health-medical nurse (*Sanitarno-fel'dsherskaia*)
19YY—Pharmaceutical (*Farmatsevticheskaia*)
19YZ—Dental-technical (*Zubotekhnicheskaia*)
19ZX—Dental-medical (*Zubovrachebnaia*)
19ZY—Physical culture (*Fizicheskaia kul'tura*)
19ZZ—Medical nurse (*Meditsinskaia sestra*)

BRANCH V.—EDUCATION AND CULTURAL SERVICES

Specialty Group 2000.—Education (*Prosveshchenie*)
20XX—Teaching in elementary grades of general educational institutions (*Prepodavanie v nachal'nykh klassakh obshcheobrazovatel'noi shkoly*)
20XY—Preschool education (*Doshkol'noe vospitanie*)
20XZ—Teaching of drafting and drawing (*Prepodavanie cherchenii i risovaniia*)
20YX—Library work (*Bibliotechnoe delo*)
20YY—Cultural-educational work (*Kul'turno-prosvetitel'naia rabota*)
20YZ—Editing of books and journals (*Korrektirovanie knig i zhurnalov*)
20ZX—Technical editing of books and journals (*Tekhnicheskoe redaktirovanie knig i zhurnalov*)

Specialty Group 2100.—Art (*Iskusstvo*)
2111—Artistic-theatrical props (*Khudozhestvenno-butaforskaia*)
2112—Artistic-theatrical costumes (*Khudozhestvenno-kostiumernaia*)
2113—Theatrical lighting engineering (*Teatral'naia svetotekhnika*)
2115—Sculpture (*Skul'ptura*)
2116—Artistic (wall) painting (*Khudozhestvennaia rospis'*)
2121—Fashioning of shoes and artistic fashioning of leather (*Modelirovanie obuvi i khudozhestvennoe oformlenie kozhi*)
2122—Artistic weaving (*Khudozhestvennoe tkachestvo*)
2123—Artistic modeling of hosiery products (*Khudozhestvennoe oformlenie trikotazhnykh izdelii*)

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2124—Artistic embroidery and lace production (*Khudozhestvennoe vyshivanie i kruzhevnoe proizvodstvo*)
2125—Modeling and fashioning of clothes (*Modelirovanie i konstruirovanie odezhdy*)
2118—Decorative wood-work, ivory and stone modeling (*Khudozhestvennaia obrabotka dereva, kosti i kamnia*)
2119—Art and decorative glass (*Khudozhestvennaia obrabotka stekla*)
2120—Art and decorative ceramics (*Khudozhestvennaia keramika*)
21XX—Piano playing (*Fortepiano*)
21XY—Art reading (*Chtenie*)
21XZ—Singing (*Penie*)
21YX—Theory of music (*Teoriia muzyki*)
21YY—Choir conducting (*Khorovoe dirizhirovanie*)
21YZ—Folk instruments (*Narodnye instrumenty*)
21ZX—String instruments (*Strunnye instrumenty*)
21ZY—Wind and percussion instruments (*Dukhovye i udarnye instrumenty*)
21ZZ—Theatrical-decoration (*Teatral'no-dekoratsionnaia*)
21PP—Theatrical make-up (*Khudozhestvenno-grimernaia*)
21PQ—Choreography (*Khoreograficheskaia*)
21PR—Artistic metal-work (*Khudozhestvennaia obrabotka metalla*)
21PS—Circus performing (*Tsirkovoe iskusstvo*)

TABLE III–B–2.—*Reconstructed program of instruction from individual course syllabi of Soviet technicum for radio engineering (Specialty 0704), 1958*

Subject of instruction	*Total instruction hours*
I. General subjects	*1570*
A. General Russian language and literature	
1–5. History, political economy, foreign language, physical education [d]	• 868
B. Science courses, total:	702
6. Mathematics (geometry, algebra, trigonometry, general introduction to calculus) 402	
7. Physics (mechanics, heat and molecular theory, electricity, optics, atomic structures) 210	
8. Chemistry (general inorganic chemistry) 90	
II. General engineering	*1108*
9. Technical drawing (largely projectional drawing)	240
10. Materials technology (mainly metals, casting, stamping, metallography, tolerances, soldering and welding)	260
11. Theoretical and engineering mechanics (Theoretical: statics, dynamics, kinematics; Engineering: strength of materials, machine components)	260
12. Machines and instruments (survey of power generating, combustion engines and installation, control devices)	120
13. Foundations of electrical engineering and measuring instruments (AC/DC generators, lines, networks, equipment, instruments)	[a] 228
III. Specialized engineering	*1116*
14. General principles of radio engineering (theory of circuits and components)	84
15. Instruments and measurements in radio engineering (instruments, bridges, calibrating generators, oscillographs, etc.)	60
16. Fundamentals of radar, radionavigation and television	163
17. Design of radio equipment, total	[b] 268
a. Electro-mechanical design of components 97	
b. Resistors, induction coils, condensers and component circuits 57	
c. General design (component blocks, including acoustics) 114	
18. Vacuum tubes (including semi-conductors and photoelectric cells)	75
19. Receivers (divided into two broad areas: high frequency circuits, low frequency circuits)	147
20. Transmitters (various types of amplifiers, generators and ultra-high frequency technology)	113
21. Power supply (rectifiers, fillers, stabilizers, electromechanical devices, battery power)	60
22. Technology of production of radio equipment	[c] 76
23. Materials technology in radio engineering (dielectrics, semiconduction conductors, magnetic alloys)	70
IV. Applied instruction in workshops and industrial practice	*1440*
Grand Total	5234

Source: MVO SSSR: Upravlenie srednikh spetsial'nykh uchebnykh zavedenii (Ministry of Higher Education of the U.S.S.R.: Division of Secondary Specialized Educational Establishments), jointly with Ministerstvo Radiotekhnicheskoi promyshlennosti SSSR: Upravlenie uchebnymi zavedeniami (Ministry of the Radio-engineering Industry: Office of Educational Establishments), *Programma* (Syllabus), for each individual subject, 6 through 23, Moscow, 1956. Although the syllabi were dated 1956, this identical program was offered in the fall of 1958.

• Hours stated on the basis of the general requirement and as stated by officials of the technicum.

[a] In technicums outside of electrical engineering fields, this course is 130 instruction hours.

[b] For those receiving training as technology technicians, the total course is reduced to 76 hours.

[c] For technology technicians, this course consists of technology of components—146 hours; technology of assembly, alignment and testing—128 hours, for a total of 274 instruction hours.

[d] Physical education includes military training (called "pre-draft military training").

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TABLE III–B–3A.—*General technicum curriculum in mining engineering*

Name of courses	Total hours	Distribution in percent	Distribution of hours by type of instruction			
			Classwork		Laboratory work	Calculating and group work
			Lectures	Practical work		
I. General courses	1,493	24	551	804	138	0
1. History of U. S. S. R.	265	.....	175	90	0	0
2. Russian language and literature	316	.....	100	216	0	0
3. Mathematics	400	.....	100	300	0	0
4. Physics	228	.....	100	38	90	0
5. Chemistry	98	.....	50	0	48	0
6. Foreign language	186	.....	26	160	0	0
II. General technical courses	704	12	268	292	124	20
7. Drawing	172	.....	12	160	0	0
8. Technical mechanics	232	.....	110	82	20	20
9. Electrotechnology	146	.....	60	26	60	0
10. Machinery	84	.....	40	24	20	0
11. Technology of metals	70	.....	46	0	24	0
III. Special courses	1,717	28	866	210	441	200
12. Geology	100	.....	60	20	20	0
13. Mining	452	.....	252	40	60	100
14. Geodesy and mine surveying	93	.....	50	0	23	20
15. Mining machinery	270	.....	100	0	130	40
16. Mine transportation	154	.....	60	20	54	20
17. Mining mechanics	152	.....	70	42	40	0
18. Mining electrotechnology	182	.....	80	22	60	20
19. Fundamentals of enriching coal yield	64	.....	40	0	24	0
20. Economics and organization of production	94	.....	60	34	0	0
21. Calculation (cost accounting)	32	.....	20	12	0	0
22. Rules for technical exploitation	60	.....	40	20	0	0
23. Mine safety	64	.....	34	0	30	0
IV. Industrial practice	2,022	33	0	2,022	0	0
24. Work in workshops	210	.....	0	210	0	0
25. Practice work (field trips)	372	.....	0	372	0	0
26. Practice work (in courses)	1,440	.....	0	1,440	0	0
V. Physical culture and military training	186	3	0	186	0	0
Grand total of hours	6,122	.....	1,685	3,514	703	220
Distribution in percent	.....	100	27	58	11	4

Source: This is a proposed curriculum of mining technicums abstracted from *Ugol'*, No. 8, 1951, as reproduced in Gorokhoff, *Materials*, p. 216. On the basis of the article itself the actual curriculum is reconstructed as presented in Table III–B–3–B.

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TABLE III–B–3B.—*Reconstructed technicum curriculum for mining engineering with specialization in exploitation of mineral deposits*

Name of course	Total hours	Classwork	Laboratory and practical work
I. General courses:			
1. History of U. S. S. R.	252	252	0
2. Russian language and literature	299	299	0
3. Mathematics	401	401	0
4. Physics	214	198	26
5. Chemistry	91	71	20
6. Foreign language	(?)186	(?)186	0
II. General technical courses:			
7. Drawing	(?)172	(?)172	0
8. Technical mechanics	(?)232	(?)232	0
9. Electrotechnology	125	100	25
10. Machinery	(?)84	(?)84	0
11. Technology of metals	(?)70	(?)70	0
III. Special courses:			
12. Geology	(?)100	(?)100	0
13. Mining	421	(?)421	0
14. Geology and mine surveying	76	76	0
15. Mining machinery	162	112	50
16. Mine transportation	117	97	20
17. Mining mechanics	140	110	.....
18. Mining electrotechnology	114	114	30
19. Fundamentals of enriching coal yield	(?)64	(?)64	.....
20. Economics and organization of production	(?)94	(?)94	0
21. Calculation (cost accounting)	(?)32	(?)32	0
22. Rules for technical exploitation	54	54	0
23. Mine safety	0	0	0
IV. Industrial practice:			
24. Work in workshops	(?)	(?)	(?)
25. Practice work (field trips)	0	(?)	(?)
26. Practice work (by courses)—c. 25 weeks (12.6 percent of total time).			
Thesis (about 1 semester)			
Physical culture and military training	186	0	186
Grand total—approximate	6,100	.....	.....

?—number of hours in actual program is not certain.

Source: This somewhat fragmentary actual curriculum refers to 1950–51. It does not differ drastically from the proposed curriculum, which except for omission of time allocated for final examinations for certification and diploma project, is undoubtedly based on the general pattern of an engineering technicum curriculum. This reconstruction of the actual curriculum was done by Gorokhoff, *Materials*, p. 217. Further comments and additional information about syllabi may be found in this study.

TABLE III–B–4.—*Curriculum in 4–year technicum for agricultural technicians in agronomy (Specialty 1501) as of 1956*

Subjects of instruction	Instruction hours			Term in which offered
	Total	Classroom	Laboratory	
I. General	1,500	1,408	142	1–5
A. General	740	740	.....	1–5
1. History of the U. S. S. R.	260	260	.....	1–5
2. Russian language & literature	300	300	.....	1–5
3. Foreign language	180	180	.....	1–5
B. Sciences	810	668	142	1–3
4. Mathematics	300	300	.....	1–3
5. Physics (including agricultural meteorology)	240	218	22	1–3
6. Chemistry	270	150	120	1–3
II. Technical agricultural (general and specialized)	1,984	1,412	572	1–8
7. Botany	180	110	70	1–3
8. Fundamentals in geodesy	40	20	20	4
9. General agronomy and soil science	250	176	74	2–4
10. Soil conservation and forestry	80	66	14	4
11. Soil cultivation & plant care	220	160	60	4–8
12. Fruit and vegetable growing	150	120	30	6–8
13. Selection and seed culture	90	66	24	7–8
14. Insecticides and plant diseases	120	80	40	5–7
15. Animal breeding	230	180	50	4–8
16. Mechanization and electrification of agriculture	230	170	60	3–7
17. Economics and organization of agricultural production and fundamentals of accounting	260	150	110	5–8
18. Specialized subject (study of one culture, such as wheat, sugar beets, flax, cotton, etc.)	134	114	20	6–8
III. Other	246	246	.....	1–6
19. Safety and first aid	48	48	.....	3–4
20. Physical education and military training	198	198	.....	1–6
Total	3,780	3,006	714	
IV. Applied practical and field work (estimated at 40 required weeks and 46 hours per week)	1,840	.....	.....	2–8
Grand total	5,620	.....	.....	

Source: K. A. Ivanovich, *Sel'skokhoziaistvennoe obrazovanie v SSSR* (Agricultutal Education in the U.S.S.R.), Moscow, 1958, p. 187–96. The actual curriculum appears on pp. 188–89.

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TABLE III–B–5.—*Secondary semiprofessional school curriculum in 3–year (fel'dsher) medical schools*

	Percent of time allocated	Total	Theory	Practice
		Hours	*Hours*	*Hours*
I. General instruction		58	58	.....
1. Native language	.....	196	196	.....
2. Russian language	.....	78	78	.....
3. Mathematics	.....	138	138	.....
4. History of U. S. S. R.	.....	78	78	.....
5. Economic geography	.....	80	80	.....
6. Latin	.....			
Total	14	628	.....	.....
II. General medical and biologic instruction:				
7. Anatomy and histology	.....	196	118	78
8. Physiology	.....	94	56	38
9. Biology	.....	60	40	20
10. Physics	.....	100	84	16
11. Chemistry	.....	118	78	40
12. Bacteriology	.....	94	56	38
13. Pharmacology and materia medica	.....	207	130	77
14. Pathology	.....	96	58	38
15. Hygiene	.....	176	98	78
16. Public health and sanitation	.....	40	20	20
Total	26	1,181	.....	.....
III. Medico-military instruction:				
17. Barrage preparation	.....	46	46	.....
18. Frontline preparation	.....	156	156	.....
19. Special preparation	.....	48	12	36
20. History of Red Army	.....	46	46	.....
21. Military topography	.....	12	12	.....
22. Therapy of gas warfare	.....	54	38	16
23. Organization of sanitation service of Army	.....	40	40	.....
24. Medical air-raid defense	.....	30	30	.....
Total	10	432	.....	.....
IV. Clinical instruction:				
25. Internal medicine with care of patients and medical technics	.....	326	174	152
26. Surgery, with traumatology and field surgery	.....	354	174	180
27. Obstetrics and gynecology	.....	230	118	112
28. Pediatrics	.....	140	76	64
29. Infectious diseases with epidemiology, disinfection and immunization	.....	261	140	121
30. Dermatology and venereal diseases	.....	92	58	36
31. Neuropsychiatry	.....	73	52	21
32. Ophthalmology	.....	60	40	20
33. Otorhinolaryngology	.....	38	20	18
34. Physiotherapy, massage and physical culture	.....	67	32	35
35. Medical practice in district hospitals	.....	288	.....	288
Total	43	1,929	.....	.....
V. Examinations	7	324	324	.....
Total hours instruction	.....	4,494	2,952	1,542
Percent of time allocated	100	.....	66	34

Source: M. B. Shimkin, "Medical Education in the Soviet Union," in *American Review of Soviet Medicine*, The American-Soviet Medical Society, New York, 1943, p. 478. This curriculum refers to 1942. Apparently medical-military instruction was heavier at that time than ordinarily. Further comments about secondary medical training may be found in this source.

TABLE III–B–6.—*Secondary semiprofessional school curriculum in 4-year pedagogical school for elementary teachers as of 1952*

Subjects of instruction	Total instruction hours	Year in which offered
1. Russian language and methodology	440	1–4
a. Russian language	350	1–4
b. Methodology of teaching Russian language	90	3,4
2. Literature	495	1–4
a. Literature (general survey)	417	1–4
b. Children's literature	78	4
3. Mathematics and methodology	647	1–4
a. Arithmetic	248	1–4
b. Algebra	144	1,2
c. Geometry	182	1–3
d. Methodology of teaching arithmetic	73	3,4
4. Physics	254	1–3
5. Chemistry and mineralogy	110	1
6. Natural sciences and methodology	295	1–4
a. Anatomy and human physiology	68	1
b. Botany	72	2
c. Zoology	55	3
d. Fundamentals of Darwinism	64	4
e. Methodology of teaching natural sciences	36	3
7. Geography and methodology	270	1–4
a. Soil sciences	91	1
b. Geography of foreign countries	72	2
c. Geography of the U. S. S. R.	72	3
d. Methodology of teaching geography	35	3,4
8. History and methodology	398	1–4
a. History of the U. S. S. R.	254	1–3
b. Modern history	110	2,3
c. Methodology of teaching history	34	3
9. History of the Communist Party of the U. S. S. R.	128	4
10. Psychology	57	2
11. General pedagogy	190	2–4
12. History of pedagogy	64	4
13. Logic	54	4
14. School hygiene	36	4
15. Penmanship and calligraphy	108	1–3
16. Drawing and methodology	248	1–4
17. Singing and methodology	212	1–4
18. Physical education and methodology	280	1–4
19. Applied work in workshops and agriculture	224	1–4
20. Teaching practice	212	2–4
Grand total	4,722	
Additional optional electives: foreign language, choir or solo singing	up to 560	

Source: *Medynskii–1955*, pp. 179–180.

TABLE III–B–7.—*Secondary semiprofessional school curriculum in 2-year pedagogical school for preschool teachers as of 1954*

[Advanced program accepting 10-yr.–school graduates]

Subjects of instruction	*Total instruction hours*
1. History of the Communist Party of the U.S.S.R.	138
2. Anatomy and physiology and preschool hygiene	127
3. Child psychology	76
4. Preschool pedagogy	174
5. History of pedagogy	66
6. Children's literature	99
7. Methodology of teaching Russian language in preschools and story telling	124
8. Methodology of teaching nature studies	138
9. Drawing, clay modeling and methodology	243
10. Practical work in workshops	138
11. Singing, music and musical education	243
12. Physical education	210
13. Methodology of teaching numbers	19
14. Teaching practice in preschool institutions	338
Grand Total	2133
Optional electives: choir or solo singing	up to 140

Source: *Medynskii–1955*, p. 181.

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TABLE III–C–1.—*Number of Soviet secondary semi-professional schools, 1914–59*

Year end	Total number of institutions (a)	Of which distributed by field—				
		Engineering (b)	Agricultural (c)	Socio economic (d)	Education and arts (of which arts only) (e)	Health (f)
1914x	450	.....	.....	.....	.....	.....
1914y	295	.....	.....	.....	.....	.....
1922	932	.....	.....	.....	.....	.....
1923	903	.....	.....	.....	.....	.....
1924	921	.....	.....	.....	.....	.....
1925	983	.....	.....	.....	.....	.....
1926	1,016	.....	.....	.....	.....	.....
1927	1,033	201	204	58	473 (90)	97
1928	1,054	215	207	60	477 (81)	95
1929	1,111	280	226	59	449 (71)	97
1930	2,932	1,129	651	217	717 (99)	218
1931	3,096	906	801	[289]	867	233
1932	3,509	.....	.....	.....	.....	.....
1933	2,861	737	646	[309]	917	252
1934	2,639	645	652	[186]	905	251
1935	2,597	.....	.....	.....	.....	.....
1936	2,861	.....	.....	.....	.....	.....
1937	3,496	.....	.....	.....	.....	.....
1938	3,732	634	515	111	1,035	1,437
1939	3,733	671	550	163	1,029 (192)	1,320
1940	3,773	.....	.....	.....	.....	.....
1945	3,169	.....	.....	.....	.....	.....
1946	3,375	.....	.....	.....	.....	.....
1947	3,458	.....	.....	.....	.....	.....
1948	3,526	.....	.....	.....	.....	.....
1949	3,433	.....	.....	.....	.....	.....
1950	3,424	.....	.....	.....	.....	.....
1951	3,541	.....	.....	.....	.....	.....
1952	3,604	.....	.....	.....	.....	.....
1953	3,726	.....	.....	.....	.....	.....
1954	3,795	.....	.....	.....	.....	.....
1955	3,753	.....	.....	.....	.....	.....
1956	3,642	.....	.....	.....	.....	.....
1957	3,498	.....	.....	.....	.....	.....
1958	3,346	.....	.....	.....	.....	.....
1959	3,330	.....	.....	.....	.....	.....

SOURCES AND NOTES TO APPENDIX TABLE III–C–1

1914x—Within present (postwar) U.S.S.R. boundaries
1914y—Within pre-1939 U.S.S.R. boundaries
[ ]—Figures derived as a residual

In general it must be noted that the number of institutions fluctuated not only from year to year but also within a given year. Some stability in the number of institutions was reached only toward the end of the 1930's. Year references in the table refer to year end (or fall of an academic year).

Place in Table *Sources and Discussion*

a 1914x, 1914y, 1922–40, 1945–55.—*KS–1956*, pp. 201–02.
a 1955–58.—*NarKhoz–1959*, p. 883.
a 1959.—*NarKhoz–1960*, p. 740.
a–f 1927–30.—*NarKhoz–1932*, p. 514.
a–f 1931.—*SotsStroi–1936*, p. 573.
b,c,e,f 1933.—*Kult't Stroi–1935*, pp. 68–69.
a–f 1934.—*Kul't Stroi–1934*, p. 39. About the same distribution is given in *SotsStroi–1936*, p. 573.
a–f 1938.—*SotsStroi–1933–38*, p. 121.
a–f 1939.—*Kul't Stroi–1940*, p. 256; also (a) in *BSE-SSSR*, 1947, col. 1761.
General note.—For some of the years during 1927–34, recent Soviet sources (*KS–1956*) give slightly divergent totals for the number of technicums, without any breakdowns however. For 1938 and 1939 the totals are identical.

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TABLE III–C–2.—*Number of Soviet secondary semiprofessional schools by administrative jurisdiction and republic as of January 1959*

	Russian SFSR	Ukrainian SSR	Belorussian SSR	Uzbek SSR	Kazakh SSR	Georgian SSR	Azerbaidzhan SSR	Lithuanian SSR	Moldavian SSR	Latvian SSR	Kirgiz SSR	Tadzhik SSR	Armenian SSR	Turkmen SSR	Estonian SSR	All-union ministries and administrations	Local jurisdiction	U.S.S.R. Total	Extension-correspondence	Grand total
A. All-union central agencies (ministries) and administrations	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*215	.....	215	.....	215
B. Union-republic, regional and local administrations																				
1. Administrative councils of national economy																				
a. Union republics	.....	.....	16	.....	.....	7	6	9	4	8	4	2	8	3	7	.....	.....	74	.....	74
b. Provinces and regions	545	148	.....	13	32	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	738	21	759
Union-republic ministries (or chief administrations) of:																				
2. Agriculture	281	126	32	15	31	30	16	20	8	21	8	3	10	5	12	.....	.....	618	3	621
3. Education	188	36	10	10	11	6	14	3	4	2	2	6	3	4	2	.....	.....	301	3	304
4. Culture	165	51	10	8	14	12	5	8	3	11	3	4	6	3	5	.....	.....	308	.....	308
5. Health	178	89	12	14	23	21	19	5	7	9	6	4	2	4	3	.....	.....	396	.....	396
6. Finance	25	2	2	1	1	1	.....	1	1	.....	1	1	.....	.....	.....	.....	.....	36	1	37
7. Trade	28	10	2	1	3	1	1	1	1	1	1	1	1	1	1	.....	.....	54	2	56
8. Construction	9	.....	3	4	.....	1	1	1	.....	1	1	1	.....	.....	.....	.....	.....	22	1	23
9. Urban and communal service	12	.....	1	1	.....	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	16	1	17
10. Local industry	2	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	4
11. Water supply and irrigation	.....	.....	.....	4	1	.....	1	.....	.....	.....	1	.....	.....	1	.....	.....	.....	8	.....	8
12. River transport	17	4	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22	1	23
13. Automobile transport and highways	23	6	1	1	1	.....	.....	.....	1	.....	1	1	1	.....	.....	.....	.....	36	2	38
14. Geology and conservation or natural resources	3	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	5	.....	5
15. Grain production (procurement) and grain products	8	2	.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	12	1	13
16. Committees on physical culture and sports	5	3	.....	.....	.....	.....	.....	.....	1	.....	.....	1	.....	1	.....	.....	.....	11	.....	11
17. Union-republic producers' cooperatives	21	7	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31	3	34
18. Union-republic consumers' cooperatives	4	8	2	4	7	1	1	1	1	1	1	1	1	1	1	2	.....	37	1	38
19. Local consumers' cooperatives (city and district)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	42	42	.....	42
20. Local (city and district) soviets	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29	29	.....	29
21. Miscellaneous (not elsewhere classified)	5	1	.....	.....	.....	1	3	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	11	3	14
Grand total	1,519	493	93	78	126	82	69	49	31	57	29	25	32	23	31	218	71	3,026	43	3,069

Source: Tabulation of actual technicums in existence from *Sprav–SSU–1959, passim.*

*All-union central agencies (ministries) operated secondary semiprofessional schools as follows:

1. Sea transport (U.S.S.R.)	14
2. Railway transport (U.S.S.R.)	90
3. Communications (U.S.S.R.)	22
4. Transportation construction (U.S.S.R.)	20
5. Ministry of interior (MVD), Main Administration of Geodesy and Cartography	8
6. Hydrometeorology of Council of Ministers of U.S.S.R.	8
7. Main Administration of State Labor Reserve of Council of Ministers of U.S.S.R.	29
8. State Bank of U.S.S.R.	12
9. Committee on Standards and Measures (U.S.S.R.)	1
10. Central Statistical Administration	11
Grand Total	215

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Appendix to Chapter IV

APPENDIX IV–AR.—Rules for Admission to Regular Higher Educational Establishments in the U.S.S.R. for the Academic Year 1959–60

TABLE IV–A–O.—Distribution by Previous Preparation of Entrants into Soviet Higher Educational Establishments in the Fall of a Given Year

TABLE IV–A–1–S.—Aggregate Acceptances, Enrollment in and Graduations from Soviet Higher Educational Establishments by Type of Program of Study in Selected Years, 1914–59

TABLE IV–A–1–A.—Acceptances in Soviet Higher Educational Establishments, 1928–60

TABLE IV–A–1–E.—Enrollment in Soviet Higher Educational Establishments, 1928–59

TABLE IV–A–1–G.—Graduations from Soviet Higher Educational Establishments, 1928–60

General Notes to Tables IV–A–1–A, IV–A–1–E, and IV–A–1–G

Sources and Notes to Table IV–A–1–A

Supplement to Table IV–A–1–A

Sources and Notes to Table IV–A–1–E

Supplement to Table IV–A–1–E (Total Enrollment in Soviet Higher Educational Establishments, 1914–28)

Sources and Notes to Table IV–A–1–G

Supplement to Table IV–A–1–G

TABLE IV–A–2.—Graduation Rates in Soviet Higher Educational Establishments, 1946–59

TABLE IV–A–3.—Projection Estimate of Graduating Classes in All Fields from Soviet Higher Educational Establishments, 1956–65, and Actual Graduations, 1956–59

TABLE IV–A–4.—Projection of 1959–65 Graduates from Soviet Higher Educational Establishments by Branch

TABLE IV–A–5.—Relative Proportion of Women among Regular Full-time Students in Soviet Higher Educational Establishments, 1926–37, 1940, 1950, 1955–59

TABLE IV–A–6.—Composition by Social Origin of Students in Soviet Higher Educational Establishments, 1927–38

TABLE IV–A–7.—Composition of Regular Students by Nationality in Soviet Higher Educational Establishments, 1927, 1929–35, 1950, 1956–59

Supplement to Table IV–A–7. (National Composition of Students Enrolled in Soviet Higher Educational Establishments, Selected Years, 1927–59)

APPENDIX IV–B–1.—Specialties (*spetsial'nosti*) Offered in Soviet Higher Educational Establishments as of 1959

APPENDIX IV–B–2.—Divisions of Instruction (*fakul'tety*) of Soviet Higher Educational Establishments

APPENDIX IV–B–3.—Directory of Institutes, Universities, Divisions and Specialties in Soviet Higher Educational Establishments as of 1959

Supplement to Appendix IV–B–3 (List of Soviet Military Higher Educational Establishments of the Academy Type)

General Note to Tables IV–B–4 through IV–B–21

TABLE IV–B–4.—Physics—University Program: Comparison of 1955 and 1959 Curricula (Specialty 2016)

Supplement to Table IV–B–4

TABLE IV–B–5.—Chemistry—University Program: Comparison of 1955 and 1959 Curricula (Specialty 2018)

Supplement 1 to Table IV–B–5

Supplement 2 to Table IV–B–5 (Chemistry Courses Required of Moscow State University Students as of 1945)

TABLE IV–B–6.—Mechanics—University Program: Comparison of 1955 and 1959 Curricula (Specialty 2014)

Supplement to Table IV–B–6

TABLE IV–B–7.—Humanities—Russian Language and Literature, University Program: Comparison of 1955 and 1959 Curricula (Specialty 2001)

Supplement to Table IV–B–7

TABLE IV–B–8.—Economics—Political Economy in Universities: Comparison of 1955 and 1959 Curricula (Specialty 2010)

Supplement to Table IV–B–8

TABLE IV–B–9.—Electrical Engineering—Electronic Equipment, Institute Program: Comparison of 1955 Curricula—5-year General and 5½-year Individual (Specialty 0611)

Supplement to Table IV–B–9

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TABLE IV–B–10.–Mechanical Engineering–Machine Building (Turbines)–Institute Curriculum: Comparison of 1955 General 5-year and Individual 5½-year Curriculum (Specialty 0521)

Supplement to Table IV–B–10

TABLE IV–B–11.–Mechanical Engineering–Design and Technology of Machine Tools: Institute Curriculum, 1946

Supplement to Table IV–B–11 (Reconstruction of M.I.T. Curriculum in Mechanical Engineering, with Specialty in Materials Technology and Metals Processing, 1952)

TABLE IV–B–11A.–Mechanical Engineering–Design and Technology of Machine Tools–Institute Curriculum, 1955 (Specialty 0501)

Supplement to Table IV–B–11A

TABLE IV–B–12.–Chemical Engineering–Technology of Silicates: Institute Curriculum, 1938

Supplement to Table IV–B–12 (Reconstruction of M.I.T. Curriculum in Chemical Engineering, with Specialty in Industrial Chemistry)

TABLE IV–B–12A.–Chemical Engineering–Technology of Silicates: 5-Year Institute Curriculum, 1955 (Specialty 0806)

Supplement to Table IV–B–12A

TABLE IV–B–13.–Civil Engineering–Hydrotechnical Structures and Power Stations: Comparison of 1955 General and Individual 5-Year Curricula (Specialty 1203)

Supplement 1 to Table IV–B–13

Supplement 2 to Table IV–B–13 (Courses in the Soviet Programs of Training in Civil Engineering, with Specialization in Hydrotechnical Structures, Late 1930's)

TABLE IV–B–14.–Operations and Maintenance Engineering–Automotive Transport: 5-Year Institute Program, 1955 (Specialty 1609)

Supplement to Table IV–B–14

TABLE IV–B–15.–Engineering Economics–Economics and Organization of Machine Building Industry: Comparison of 1955 and 1959 Curricula (Specialty 1709)

Supplement to Table IV–B–15

APPENDIX IV–B–16.–Diploma Project Requirements in a Soviet Engineering Institute

TABLE IV–B–17.–Agronomy: 5-Year Program in Agricultural Institutes, 1955 Curriculum (Specialty 1502)

Supplement 1 to Table IV–B–17

Supplement 2 to Table IV–B–17 (4-Year Program of Instruction in Agronomy Offered at Timiriazev Agricultural Academy in Moscow, 1945)

TABLE IV–B–18.–Veterinary Medicine: 5-Year Program in Veterinary Institutes and Departments, 1955 Curriculum (Specialty 1507)

Supplement 1 to Table IV–B–18

Supplement 2 to Table IV–B–18 (4-Year Veterinary Medicine Program as of 1947)

TABLE IV–B–19.–Medicine: Comparison of Soviet 6-Year Medical Curricula, 1945 and 1955

Supplement 1 to Table IV–B–19 (A Comparison of Medical Curricula in the Soviet Union and in Three American Medical Schools as of the Mid-1950's)

Supplement 2 to Table IV–B–19 (A Historical Comparison of Medical Curricula in Soviet and American Medical Schools)

TABLE IV–B–20.–Pedagogy, Teacher of Physics and Fundamentals of Production: 5-Year Program in Pedagogical Institutes as of 1957 (Specialty 21YZ)

Supplement to Table IV–B–20

TABLE IV–B–21A.–Curriculum of Interregional Communist Party Schools (*MPSh*) for Party Functionaries

TABLE IV–B–21B.–Curriculum of Interregional Communist Party Schools (*MPSh*) for Newspaper Workers

General Note to Appendix Tables IV–C–1, IV–C–2 and IV–C–3

TABLE IV–C–1.–Official Reporting of the Total Number of Soviet Higher Educational Establishments, 1914, 1920–59

TABLE IV–C–2.–Number of Soviet Higher Educational Establishments, by Field, for Selected Years, 1913–49

TABLE IV–C–3.–Soviet Higher Educational Establishments, by Type, Branch and Specialty Group as of 1947, 1954, 1955, 1958 and 1959

TABLE IV–D–1.–Teaching Staffs in Soviet Higher Education, 1927–59

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APPENDIX IV-AR.—*Rules for Admission to Regular Higher Educational Establishments in the U.S.S.R. for the Academic Year 1959–60*

Decree of the Ministry of Higher Education of the U.S.S.R.

I. To regular (daytime) higher educational establishments are admitted citizens of the U.S.S.R. of either sex, up to the age of 35, who have completed secondary education, who have presented favorable character and social references for admission to the higher educational establishment from the Communist Party, labor union, Komsomol and other social organizations, from heads of industrial enterprises and institutions or managers of collective farms, and who have successfully passed competitive entrance examinations.

To universities and other higher educational institutions which offer training in the specialties of journalism, law (jurisprudence), literary work, philosophy, political economy, are admitted only persons who have a record of active employment for a period of not less than 2 years.

To pedagogical, medical, stomatological, pharmaceutical institutes, and also for the specialty of international relations are admitted primarily persons who have a record of active employment in the respective field.

NOTE.—Persons who have completed secondary specialized educational establishments and technical schools are admitted to higher educational establishments if they have worked for 3 years upon the completion of the secondary specialized educational establishment or vocational-technical school. This employment record is not required of persons who, after completion of the secondary specialized educational establishment or the vocational-technical school, have been in active military service for a period of not less than 2 years. Nor is this period of employment required of persons who are included in the top 5 per cent of the graduating class of the secondary specialized educational establishment.

II. Admission to regular (daytime) higher educational establishments is based on the results of competitive entrance examinations on the basis of the competitive selection (*konkursnyi otbor*) of applicants who have shown themselves most worthy in production, who are better prepared and more gifted. Thereby preference for admission is given to persons who have the highest grade in the major examination subjects which are most important for their chosen field of study; and in the case of equal scores, persons who have scored highest in other subjects on the entrance examination are given first preference.

The major subjects, among those in which entrants are examined, are marked with an asterisk in section III of the Rules for Admission.

The Committee on Admissions in each establishment makes acceptances in the following order:

(a) *Persons admitted without entrance examinations.*—In order of receipt of applications are admitted veterans of the Second World War (Great Patriotic War) who have a secondary school graduation certificate with honors or who have been awarded a gold or silver medal "for excellence in study and exemplary conduct" upon the completion of the secondary school.

(b) After these admissions, preference is given to persons who have shown themselves outstanding workers during a period of not less than 2 years of actual employment in industrial or agricultural enterprises or in other branches of the national economy, culture, public health, government work, as well as veterans of the Second World War and persons demobilized from the Soviet Army or Navy who obtain the highest scores on the entrance examinations. In this category, first preference is thereby to be given to persons who have a record of actual employment in the same field in which they intend to study for their specialty in the higher educational establishment.

(c) In case the combined number of applications from veterans of the Second World War, persons with an active employment record of 2 years or more, and persons demobilized from the Soviet Army or Navy exceeds 80 per cent of the planned number of admissions in a given higher educational establishment or any of its divisions, the director (or dean) of a higher educational establishment shall reserve 20 percent of the planned number of admissions which are to be filled on the basis of general competition through the entrance examination.

(d) The vacancies remaining after the admission of the persons mentioned above in paragraphs (a) and (b) of section II are filled by accepting persons who have the highest grades in their entrance examinations with weighted consideration given to the character and social references presented by them for entering the higher educational establishment.

Persons who were awarded gold or silver medals upon the completion of the secondary school and honor graduates of secondary specialized establishments included in the top 5 percent of the graduating class are given preference in admission, if all other conditions and entrance examination scores are equal.

(e) Directors (deans) of higher educational establishments are permitted to conduct competitive selection for the higher educational establishment at large or for any division or any specialty in particular. Notice of the type of competition is to be announced prior to the date for filing applications.

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III. All persons applying for admission to higher educational establishments, with the exception of persons mentioned in paragraph (a) of section II, must take entrance examinations, depending upon the specialty of the higher educational establishment, in the following subjects:

(a) in the specialties of—geology-prospecting, mining engineering, power engineering, metallurgy, machine building and instrument building, electric machine building and electric instrument building, radio engineering and communication, mechanical engineering specialties in industry (chemical, food, textile, light industry and timber industry), cinema engineering, industrial fisheries, printing, engineering economics (in all respective branches of industry indicated in this section), geodesy, cartography, construction, hydrotechnics, hydrology and meteorology, railroad, waterways, aviation and automobile transportation, mechanics-mathematics, physics, physics-mathematics, geophysics and astronomy—applicants must take entrance examinations in (asterisk indicates major subject examinations): (1) * mathematics (written and oral); (2) * physics (oral); (3) Russian language and literature (written essay); (4) one foreign language.[1]

(b) in the specialties of—chemistry, physics-chemistry, chemical technology, chemical technology of wood pulp, technology of cellulose-paper production, technology of consumer goods, technology of food products, engineering-economics (in all the respective branches of industry indicated in this section)—applicants must take entrance examinations in: (1) * mathematics (oral); (2) * physics (oral); (3) * chemistry (oral); (4) Russian language and literature (written essay); (5) one foreign language (oral).

(c) in architecture applicants must take entrance examinations in (1) mathematics (oral); (2) * physics (oral); (3) * drawing; (4) * drafting; (5) Russian language and literature (written essay); (6) one foreign language (oral).

(d) In the specialties of—philology, linguistics, journalism and literary work—the applicant must take entrance examinations in: (1) * Russian language and literature (written and oral); (2) history of the U.S.S.R. (oral); (3) * foreign language.

(e) In the specialties of—philosophy, history, history-archival work, jurisprudence, librianship, and cultural-education work—applicants must take entrance examinations in: (1) * Russian language and literature (written and oral); (2) * history of the U.S.S.R. (oral); (3) *foreign language (oral).

(f) In economics the applicant must take entrance examinations in: (1) * Russian language and literature (essay); (2) * mathematics (oral); (3) * history of the U.S.S.R. (oral); (4) geography (oral); (5) foreign language (oral).

(g) In geography specialties offered at state universities applicants must take entrance examinations in: (1) *Russian language and literature (essay); (2) *geography (oral); (3) *mathematics (oral); (4) *history of the U.S.S.R. (oral); (5) foreign language (oral).

(h) In the specialties of—medicine, stomatology, pharmacy, biology, biology-soil science, ichthyology and fish-breeding, merchandising of industrial and consumer goods—applicants must take entrance examinations in: (1) Russian language and literature (essay); (2) *physics (oral); (3) *chemistry (oral); (4) foreign language (oral).

(i) In the specialties of—agronomy, animal breeding, veterinary medicine, economics and organization of agriculture, accounting in agricultural enterprises—applicants must take entrance examinations in: (1) *physics (oral); (2) *chemistry (oral); (3) Russian language and literature (essay).

(j) In the specialties of—mechanization and electrification of the processes of agricultural production, hydromelioration, forestry engineering, forestry, land utilization—applicants must take entrance examinations in: (1) *mathematics (written and oral); (2) *physics (oral); (3) Russian language and literature (essay).

(k) In the specialty "physical culture and sports" applicants must take entrance examinations in: (1) physics (oral); (2) *chemistry (oral); (3) *the given specialty [sport]; (4) Russian language and literature (essay).

(l) In the specialties of—history and theory of expressive arts, music, theatre, painting, graphics and sculpture, cinematography, art processing of metals, wood, glass, and plastics, art ceramics, art fashioning of fabrics, interior decoration and decorative work—applicants must take entrance examinations in: (1) Russian language and literature (essay); (2) *history of the U.S.S.R. (oral); (3) *the given specialty [aptitude in art, music, etc.].

(m) Applicants to pedagogical institutes, as indicated in sub-section (1) through (8) as follows:

(1) In the specialties of—mathematics; physics, fundamentals of production and drafting; mathematics, astronomy and drafting; defectology and mathematics—applicants must take entrance examinations in: (1) *mathematics (oral and written); (2) *physics (oral); (3) Russian language and literature (essay); (4) foreign language (oral).

(2) In the specialties of—Russian language and literature; Russian language, literature and history; Russian language and literature, foreign language; foreign languages; Russian language, literature and singing; Russian language, and literature and teaching in boarding schools; foreign language and teaching in boarding schools; defectology, Russian language and literature; pedagogy and psychology—applicants must take entrance examinations in: (1) *Russian lan-

[1] Applicants must take an examination in one of the following foreign languages: English, German, French.

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guage and literature (written and oral); (2) *history of the U.S.S.R. (oral); (3) *one foreign language (oral).

(3) In the specialties of—native language and literature; Russian language and literature, native language and literature; native language and literature and history; native language and literature, foreign language; native language, literature and singing; native language and literature, teaching in boarding schools; defectology, native language and literature—applicants must take entrance examinations in: (1) *history of the U.S.S.R. (oral); (2) *Russian language and literature (exposition and dictation); (3) *native language and literature (oral and written); (4) foreign language (oral).

Persons who choose pedagogical institute specialties which have as a sub-major subject singing are additionally examined in singing.

(4) In the specialties of—natural science and chemistry; biology, chemistry, and fundamentals of agriculture; defectology—applicants must take entrance examinations in: (1) *physics (oral); (2) *chemistry (oral); (3) Russian language and literature (essay); (4) foreign language (oral).

(5) In the specialties of—biology, geography; biology and chemistry—applicants must take entrance examinations in: (1) *geography (oral); (2) *chemistry (oral); (3) Russian language and literature (essay); (4) foreign language (oral).

(6) In the specialties of—physical education; physical education, singing—applicants must take entrance examinations in: (1) physics (oral); (2) *the given specialty; (3) Russian language and literature (essay); (4) *chemistry (oral).

(7) In the specialties of—history; pedagogy and psychology (school and preschool); defectology and methods of primary education; library work and bibliographical work; methods of primary education—applicants must take entrance examinations in: (1) *history of the U.S.S.R. (oral); (2) *Russian language and literature (written and oral); (3) *mathematics (oral)—(only for persons choosing as a specialty defectology and methods of primary education).

(8) In the specialty of drawing and drafting, applicants must take entrance examinations in: (1) *history of the U.S.S.R. (oral); (2) *the given specialty; (3) Russian language and literature (essay).

NOTE TO PARAGRAPH III.—(1) Persons entering instruction sections of higher educational establishments of union republics where teaching is conducted in a non-Russian language are subject to an examination in the national language (essay) in which the teaching is conducted instead of the examination in the Russian language and literature. This provision does not apply, however, to applicants in the specialties of—philology, linguistics, journalism and literary work, philosophy, history, and history-archival work, jurisprudence, library work, cultural-educational work, pedagogy and psychology, defectology—in which fields applicants must take, in addition to the examination in their native language and literature, an examination in the Russian language and literature (exposition or dictation).

(2) Persons entering higher educational establishments in union republics in sections where teaching is conducted in the Russian language must take an examination only in the Russian language and literature (essay), with the exception of applicants choosing the following specialties—philology, linguistics, journalism and literary work—who must take examinations in the Russian language and literature (written and oral) and in the language of the native nationality of the given republic (essay).

Persons who graduated from non-Russian schools who are entering in study sections conducting instruction in the Russian language in a higher educational establishment of the union republic in which they had attended (secondary) school are tested in Russian only orally, whereby the results of this test are not taken into consideration in the course of the competitive selection, provided that the test has been passed satisfactorily. This provision does not apply to persons choosing as their specialty philology, linguistics, journalism and literary work, who must take entrance examinations in: (1) *their native language and literature (written and oral); and (2) *Russian language (essay).

(3) Persons entering higher educational establishments and taking examinations in the Russian language and the native language are exempt from the foreign language examination, with the exception of persons choosing linguistics as their specialty.

(4) Persons having no grades for foreign languages in their secondary school certificates, or having grades in such certificates for Spanish or Oriental languages, are exempt from the foreign language examination, with the exception of persons choosing linguistics as a specialty.

(5) Graduates of Tuva national secondary schools, when entering higher educational establishments located on the territory of the RSFSR, are exempt from entrance examinations in a foreign language, with the exception of persons choosing linguistics as a specialty.

(6) Veterans of the Second World War who have an honors graduation certificate *(otlichniki)* or who have been awarded gold or silver medals "for excellence in studies and exemplary conduct" upon graduation from secondary school, and who apply to the specialties of—linguistics, physical culture and sport, architecture and all specialties offered in higher educational establishments of expressive arts—must take supplemental entrance examinations in a given specialty.

IV. Entrance examinations are conducted in accordance with programs approved by the Ministry of Higher Education of the U.S.S.R., in accordance with the programs of secondary schools of general education.

In subjects in which there are both oral and written examinations, separate grades are given for oral and written examinations.

Written examinations are submitted under a pseudonym instead of the true name of the examinee and are graded by a commission consisting of not less than two examiners.

NOTE.—For purposes of selecting the best prepared and most talented youths who are entering the fields of mathematics, physics, chemistry, mechanics, biology and foreign languages—the entrance examinations in major subjects, although they are based on materials within the limits of the approved programs, place higher demands upon applicants in theoretical knowledge and

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the ability of the applicant to apply theory to the solution of practical problems.

V. The results of entrance examinations are evaluated on the basis of a system of four descriptive grades: "excellent," "good," "satisfactory," and "unsatisfactory."

VI. Persons having received an unsatisfactory grade in one of the oral or written examinations are not allowed to take any further examinations [i.e., barred from entering].

The repetition of examinations in case of unsatisfactory grades or for the purpose of improving an earlier grade is not permitted.

VII. Oral entrance examinations in each subject are conducted by examination commissions of not less than 2 examiners who are appointed by the director (rector) of the given higher educational establishment from among the most qualified teachers. Membership in these commissions is changed annually.

Examination commissions conduct their work in accordance with Regulatory Ordinance No. 332 approved by the Ministry of Higher Education of the U.S.S.R. as of March 16, 1957.

Directors (rectors) of higher educational establishments must prepare in good time a careful instruction to the examination commissions in order to ensure uniformity in the methods and conduct of examinations and in evaluating (grading) the knowledge of entrants within the limits of the prescribed programs for entrance examinations.

VIII. Each applicant is given an examination recording form with his photograph affixed.

Attendance at examinations at a strictly specified time is obligatory. Persons who are absent from any examination without valid reason are not permitted to take any further examinations.

In case of illness the applicant must notify the examining commission of his inability to come to an examination before the beginning of the examination session or present a medical certificate not later than a day after the examination.

IX. Applications for admission to higher educational establishments are accepted between June 20 and July 31.

The application must specify the division and specialty chosen by the applicant.

The application is addressed to the director (rector) of a higher educational establishment and should be accompanied by the following documents:

(1) Character and social reference recommendation for admission to a higher educational establishment, issued at the place of last employment (for persons with a record of active employment), by the Communist Party, trade union, Komsomol and other social organizations, by the head of an industrial enterprise or manager of a collective farm for collective farmers. For graduates of secondary schools, character and social reference recommendations are issued by the school administration and its social organizations.

(2) Certificate about the completion of secondary education (in original).

(3) Autobiography.

(4) Passport, military record-identity card (for persons in the military reserve) or draft registration certificate (for persons of military service age) —to be presented in person.

(5) 4 photographs (without hat, sixe 3 x 4 cm.).

(6) Transcript of record from labor (employment) book, certified by the management of the industrial enterprise or office, and in the case of collective farmers a transcript from the collective farmer's work record book, certified by the manager of the collective farm, stating whether the applicant has fulfilled, within the last two years preceding his entry into a higher educational establishment, the minimum number of labor days as required by the given collective farm. Persons accepted to a higher educational establishment with a record of active employment for not less than 2 years must submit to the higher educational establishment their labor (employment) book in the original within a period of not more than 2 weeks after the beginning of the school year. Persons who fail to present their labor books within the stipulated time will be dismissed from the higher educational establishment. September 1 is the reference date for calculating the period of active employment experience.

7. Health certificate form (No. 286) for all applicants entering a higher educational establishment must be completed either by the school physician or by the district physician of the district hospital (or clinic).

NOTE TO PARAGRAPH IX.—Applications for admission to higher educational institutions of expressive arts and music are accepted from June 1 to July 9. Entrance examinations are held from July 10 to 20, and admissions are made from July 21 to 25. Applications for admission to higher theatrical schools are accepted from June 1 to July 14. Entrance examinations are held from July 15 to 25 and admissions are made from July 26 to 29.

X. Persons who are graduates of military schools before 1946 are admitted to higher educational establishments in accordance with the provisions stated in Section II of the present rules of admission, if an applicant can produce a certificate about the completion of secondary school or a certificate from the Ministry of Defense of the U.S.S.R. stating that the general education instruction in the military school completed by the applicant corresponds to the curriculum of secondary schools.

Persons who are graduates of military schools after 1946 and who are in receipt of certificates or diplomas of the type established for secondary specialized schools (technicums) are admitted to higher educational establishments on the same basis as persons having completed [civilian] secondary specialized schools (technicums).

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XI. Directors (rectors) of higher educational establishments are permitted to accept applications from sergeants, corporals, soldiers and sailors who are completing their last year of service in the army or navy, who desire to enter a higher educational establishment, but these persons must present with their application a certificate from the commanding officers of the respective military unit to the effect of their consent to the discharge of said person into the active reserve prior to the full term of service.[2]

XII. A committee on admissions is organized by the director (rector) under his personal chairmanship. It consists of the deputy director (pro-rector) for instruction and research work, the deans of the divisions, two professors, with the participation of ranking representatives of the regional or city (and in the case of large cities—district) Communist Party, trade union and Komsomol organizations, and the heads of the Communist Party, trade union and Komsomol organizations of a given higher educational establishment.

The director (rector), or upon his instruction members of the committee on admissions, must become personally acquainted with (and interview) each applicant, check all the documents of an applicant, and supervise the correct processing and handling of documents concerning the admission of students.

The directors (rectors) must systematically supervise the work of the examination commissions.

The committee on admissions must notify the applicant within 5 days after the receipt of his application about the results of the preliminary screening of his application.

XIII. Entrance examinations are conducted from August 1 to 20, and admissions to higher educational establishments are made from August 21 to 25.

XIV. The director (rector) of the higher educational establishment schedules the medical examination of all applicants. The health certification is guided by the rules on medical selection of applicants to higher and secondary specialized educational establishments, approved by the Ministry of Public Health of the U.S.S.R. and the Ministry of Higher Education of the U.S.S.R. as of July 11–14, 1955, and by the letter of instruction No. 97 of the Ministry of Higher Education of the U.S.S.R. as of July 30, 1955. The determination of the degree of illness and any restriction upon admission are made by the medical commission of the higher educational establishment, which takes into consideration the conditions of study in the higher educational establishment and conditions of subsequent employment in a given specialty.

XV. The results of the entrance examinations and the medical certificate are submitted to the committee on admissions, which makes a decision as to the admission of the applicant to the higher educational establishment. Acceptance into the higher educational establishment is effected by order of the director (rector) on the basis of the prior decision of the committee on admissions.

The list of persons admitted to the higher educational establishment is publicly posted for general information.

XVI. The documents of persons who have not been admitted to the higher educational establishment must be returned within 5 days after submission of a special petition or upon the decision of the committee on admission concerning their rejection.

Persons who have passed the entrance examinations but who have not been accepted in a given higher educational establishment may, upon filing a petition, receive a certificate listing the grades received in all the subjects in which the applicant was examined.

These certificates are issued on a standard form and must be affixed with the signature of the executive secretary of the committee on admissions and sealed with the official seal.

XVII. The written examination papers of persons admitted to higher educational establishments must be kept in the personal file of the persons concerned until their graduation from the higher educational establishment. Written examinations of persons not admitted to higher educational establishments are kept for 3 months, after which time they are destroyed.

XVIII. The directors (rectors) of higher educational establishments must thoroughly inform applicants that the distribution of persons who passed the entrance examinations but were not admitted to a given higher educational establishment to other higher educational establishments does *not* take place.

XIX. Persons demobilized from active service in the Soviet Army or Navy who have an incompleted higher military education, in case of favorable academic record, can be enrolled in higher educational establishments as a second-year or more advanced-year student without entrance examinations, provided that the subjects taken by them in higher military schools correspond to those required in the study plan of a given specialty. In such a case the subjects are thus credited as completed by a civilian higher educational establishment. The right of admission to a higher educational establishment without entrance examinations [and for advanced standing] for persons in the category above is retained for 2 years after the date of their discharge [from active service] into the reserve.

Admission of persons in the above-mentioned category is made on the basis of a diploma certifying the completion of a higher military institution

[2] Author's note: This clause is somewhat complicated to interpret. In the Soviet armed forces privates and sailors who are promoted to noncommissioned ranks are required to serve longer terms than those they would serve had they remained without rank.

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or a certificate stating the subjects studied in the higher military institution.

XX. All problems in connection with admission to higher educational establishments are handled by a committee on admissions which operates in accordance with the rules of admission and its decisions are final.

XXI. Persons admitted as students to higher educational establishments but who fail to enroll without valid reason within 10 days after the beginning of the academic year are dismissed from the higher educational establishment.

TABLE IV–A–O.—*Distribution by previous preparation of entrants into Soviet higher educational establishments in the fall of a given year*

Previous Preparation of entrants	*(A) 1926*	*(B) 1927*	*(C) 1933*	*(D) 1934*	*(E) 1935*	*(F) 1938*	*(G) 1945*
Graduates from secondary school	52.0	[a]39.2	13.3	14.6	[c]16.5	[d]58.8	80.0
Rabfak preparatory (workers' faculty)	26.8	25.2	43.5	40.0	38.4	22.9	None
Technicums	17.7	9.8	17.7	16.5	13.4	12.9	5.0
Other (courses, self-preparatory, other VUZ)	3.5	[b]25.8	25.5	28.9	31.7	5.4	15.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] Includes graduates of 2d-level schools (*shkoly vtoroi stupeni*) and 9-year schools (*deviatiletki*).
[b] Includes 6.5 percent of FZO graduates, 8 percent military-school graduates, and 11.5 percent "other" self-preparatory.
[c] In engineering fields, 20.8 percent were regular secondary-school graduates.
[d] In engineering fields, 71.2 percent were regular secondary-school graduates.

SOURCES AND NOTES

Columns (A), (G).—Bartosek, *Vysoké*, p. 26. Until 1934 the majority of secondary school graduates had a 9-year primary and secondary education.
Column (B).—*BSE* (1st ed.), 1929, vol. 14, col. 33.
Columns (C), (D), (E).—*Kul't Stroi–1935*, p. 93; also Bartosek, *Vysoké*, p. 28.
Column (F).—*Kul't Stroi–1940*, p. 127; *Kul't Stroi–1935*, p. 93; also Bartosek, *Vysoké*, p. 28.

TABLE IV–A–1–S.—*Aggregate acceptances, enrollment in and graduations from Soviet higher educational establishments by type of program of study in selected years, 1914–59*
[Figures rounded in thousands]

	1914	1927	1932	1940	1950	1953	1955	1956	1957	1958	1959
ACCEPTANCES											
Total	.....	42.8	245.8	263.4	349.1	430.8	461.4	458.7	438.3	455.9	511.7
Regular day	.....	42.8	245.8	154.9	228.4	265.1	257.2	231.2	219.7	215.5	227.1
Evening	.....			6.6	9.1	16.6	28.4	32.6	34.7	42.2	63.5
Extension	.....	[a]	[a]	101.9	111.6	149.1	175.8	194.9	183.9	198.2	221.1
ENROLLMENT											
Total	127.0	169.0	504.0	812.0	1,247.0	1,562.0	1,867.0	2,001.0	2,099.0	179.0	2,267.0
Regular Day	127.0	169.0	504.0	558.0	818.0	995.0	1,147.0	1,177.0	1,193.0	180.0	1,146.0
Evening	[a]			27.0	27.0	48.0	81.0	101.0	127.0	153.0	196.0
Extension	[a]	[a]	[a]	227.0	402.0	519.0	639.0	723.0	779.0	846.0	925.0
GRADUATIONS											
Total	.....	28.7	43.2	126.1	176.9	220.2	245.8	259.9	266.5	290.7	338.0
Regular Day	.....	28.7	43.2	97.8	145.9	168.7	179.2	185.3	186.8	205.2	240.5
Evening	.....			4.4	2.0	3.3	4.6	5.7	7.2	8.7	13.2
Extension	.....	[a]	[a]	23.9	29.0	48.2	62.0	68.9	72.5	76.8	84.3

[a] None
Sources and Notes: *NarKhoz–1959*, pp. 830, 835, 837; *NarKhoz–1960*, pp. 740, 745, 748. Prior to 1938 extension-correspondence students were not counted as students but as attendants of training courses. Until 1958 the reporting of "regular" students meant aggregate students in day and evening divisions (*"statsionarnye"*).

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TABLE IV–A–1–A.—*Acceptances in Soviet*
[All figures

		(a) 1928	(b) 1929	(c) 1930	(d) 1931	(e) 1932	(f) 1933	(g) 1934	(h) 1935	(i) 1936	(j) 1937	(k) 1938	(l) 1939	(m) 1940
1. Engineering-industrial	T	16.8	22.9	78.4	88.6	114.5	55.8	53.3	49.1	34.6	40.0	54.0	53.4	53.7
	R	16.8	22.9	78.4	88.6	114.5	55.8	53.3	49.1	34.6	40.0	54.0	53.4	41.1
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	12.6
A. Industry and construction	T	.....	.....	.....	.....	93.3	43.7	42.6	39.0	26.5	31.8	43.5	.....	45.4
	R	.....	.....	.....	.....	93.3	43.7	42.6	39.0	26.5	31.8	43.5	.....	34.5
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	10.9
B. Transportation and communication	T	.....	.....	.....	.....	21.2	12.1	10.7	10.1	8.1	9.2	10.7	.....	8.3
	R	.....	.....	.....	.....	21.2	12.1	10.7	10.1	8.1	9.2	10.7	.....	6.6
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	1.7
2. Agricultural	T	5.4	7.9	22.5	28.4	26.9	19.2	24.7	20.2	12.3	13.2	18.6	13.6	11.9
	R	5.4	7.9	22.5	28.4	26.9	19.2	24.7	20.2	12.3	13.2	18.6	13.6	9.2
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	2.7
3. Socioeconomic	T	5.0	5.4	5.0	16.9	22.0	10.8	12.2	11.0	7.3	7.1	9.5	8.5	13.5
	R	5.0	5.4	5.0	16.9	22.0	10.8	12.2	11.0	7.3	7.1	9.5	8.5	5.8
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	7.7
4. Educational-cultural and arts (total)	T	10.4	14.1	29.9	36.6	56.4	38.4	46.3	54.1	51.7	60.0	86.4	86.3	161.2
	R	10.4	14.1	29.9	36.6	56.4	38.4	46.3	54.1	51.7	60.0	86.4	86.3	82.2
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	79.0
A. Education (universities, pedagogical and teachers' institutes) and cultural	T	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	159.0
	R	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	80.3
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	78.7
B. Arts	T	.....	.....	.....	.....	.....	.....	.....	.....	1.8	1.9	1.8	.....	2.2
	R	.....	.....	.....	.....	.....	.....	.....	.....	1.8	1.9	1.8	.....	1.9
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	0.3
5. Medical and health (including physical culture)	T	5.2	5.9	8.4	14.4	26.0	16.7	20.1	29.5	24.1	24.4	29.2	26.9	23.0
	R	5.2	5.9	8.4	14.4	26.0	16.7	20.1	29.5	24.1	24.4	29.2	26.9	23.0
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
6. Actual Total	T	42.8	56.2	144.2	184.9	245.8	140.9	182.3	163.9	130.0	147.7	197.9	188.7	263.3
	R	42.8	56.2	144.2	184.9	245.8	140.9	182.3	163.9	130.0	147.7	197.9	188.7	161.3
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	102.0
7. Other fields (CP schools) or unaccounted residual	T	.....	.....	.....	.....	.....	22.7	18.1	18.4	18.6	10.6	6.7	.....	.....
	R	.....	.....	.....	.....	.....	22.7	18.1	18.4	18.6	10.6	6.7	.....	.....
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.....
8. Actual Grand Total	T	.....	.....	.....	.....	.....	163.6	200.4	182.3	148.6	158.3	204.6	.....	263.3
	R	.....	.....	.....	.....	.....	163.6	200.4	182.3	148.6	158.3	204.6	.....	161.3
	E	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	102.0
9. Reported Grand Total	T	42.8	56.2	144.2	184.9	245.8	163.6	174.7	182.3	148.6	158.3	204.6	188.7	263.4
	R	42.8	56.2	144.2	184.9	245.8	163.6	174.7	182.3	148.6	158.3	204.6	188.7	161.5
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	101.9

[a] None.

T—Total. R—Regular. E—Extension-correspondence.

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higher educational establishments, 1928–60
[in thousands]

(n) 1941	(o) 1942	(p) 1943	(q) 1944	(r) 1945	(s) 1946	(t) 1947	(u) 1948	(v) 1949	(w) 1950	(x) 1951	(y) 1952	(z) 1953	(aa) 1954	(bb) 1955	(cc) 1956	(dd) 1957	(ee) 1958	(ff) 1959	(gg) 1960
.....	.....	.....	.....	61.9	.....	.....	.....	.....	86.0	.....	.....	.....	166.9	174.6	182.2	178.0	181.5	217.8	.....
26.9	40.2	66.0	57.2	53.6	.....	.....	.....	.....	70.1	.....	.....	.....	120.2	121.1	.....	.....	.....	.....	.....
.....	.....	.....	.....	8.3	.....	.....	.....	.....	15.9	.....	.....	.....	46.7	53.5	.....	.....	.....	.....	.....
.....	.....	.....	.....	52.5	.....	.....	.....	.....	74.0	.....	.....	.....	140.6	144.8	151.1	147.7	152.2	185.6	.....
.....	.....	.....	.....	44.8	.....	.....	.....	.....	60.2	.....	.....	.....	101.8	100.8	.....	.....	.....	.....	.....
.....	.....	.....	.....	7.7	.....	.....	.....	.....	13.8	.....	.....	.....	38.8	44.0	.....	.....	.....	.....	.....
.....	.....	.....	.....	9.4	.....	.....	.....	.....	12.0	.....	.....	.....	26.3	29.8	31.1	30.3	29.0	32.2	.....
.....	.....	.....	.....	8.8	.....	.....	.....	.....	9.9	.....	.....	.....	18.4	20.3	.....	.....	.....	.....	.....
.....	.....	.....	.....	0.6	.....	.....	.....	.....	2.1	.....	.....	.....	7.9	9.5	.....	.....	.....	.....	.....
.....	.....	.....	.....	17.9	.....	.....	.....	.....	28.5	.....	.....	.....	47.5	51.1	48.7	51.8	56.6	57.3	.....
5.8	8.3	13.9	16.6	16.1	.....	.....	.....	.....	23.8	.....	.....	.....	33.7	32.7	.....	.....	.....	.....	.....
.....	.....	.....	.....	1.8	.....	.....	.....	.....	4.7	.....	.....	.....	13.8	18.4	.....	.....	.....	.....	.....
.....	.....	.....	.....	20.4	.....	.....	.....	.....	25.5	.....	.....	.....	29.5	28.5	35.2	34.0	38.1	40.1	.....
3.6	3.7	7.1	7.7	9.3	.....	.....	.....	.....	12.8	.....	.....	.....	13.1	11.6	.....	.....	.....	.....	.....
.....	.....	.....	.....	11.1	.....	.....	.....	.....	12.7	.....	.....	.....	16.4	16.9	.....	.....	.....	.....	.....
.....	.....	.....	.....	158.8	.....	.....	.....	.....	185.4	.....	.....	.....	193.9	175.0	161.6	143.7	145.2	163.3	.....
37.4	34.7	50.0	62.6	70.8	.....	.....	.....	.....	108.7	.....	.....	.....	102.4	89.9	.....	.....	.....	.....	.....
.....	.....	.....	.....	88.0	.....	.....	.....	.....	76.7	.....	.....	.....	91.5	85.1	.....	.....	.....	.....	.....
.....	.....	.....	.....	155.0	.....	.....	.....	.....	182.6	.....	.....	.....	191.1	172.1	158.6	140.3	141.3	159.0	.....
.....	.....	.....	.....	67.0	.....	.....	.....	.....	106.1	.....	.....	.....	99.9	87.5	.....	.....	.....	.....	.....
.....	.....	.....	.....	88.0	.....	.....	.....	.....	76.5	.....	.....	.....	91.2	84.6	.....	.....	.....	.....	.....
.....	.....	.....	.....	3.8	.....	.....	.....	.....	2.8	.....	.....	.....	2.8	2.9	3.0	3.4	3.9	4.3	.....
.....	.....	.....	.....	3.8	.....	.....	.....	.....	2.6	.....	.....	.....	2.5	2.4	.....	.....	.....	.....	.....
.....	.....	.....	.....	negl.	.....	.....	.....	.....	0.2	.....	.....	.....	0.3	0.5	.....	.....	.....	.....	.....
.....	.....	.....	.....	26.7	.....	.....	.....	.....	23.7	.....	.....	.....	31.3	32.3	31.0	30.8	31.9	33.2	.....
20.9	21.2	30.2	30.2	26.7	.....	.....	.....	.....	22.2	.....	.....	.....	29.7	30.3	.....	.....	.....	.....	.....
.....	.....	.....	.....	(a)	.....	.....	.....	.....	1.5	.....	.....	.....	1.6	2.0	.....	.....	.....	.....	.....
.....	.....	.....	.....	285.7	.....	.....	.....	.....	349.1	.....	.....	.....	469.1	461.5	458.7	438.3	453.3	511.7	.....
94.6	108.1	167.1	174.3	176.5	.....	.....	.....	.....	237.6	.....	.....	.....	299.1	285.6	.....	.....	.....	.....	.....
.....	.....	.....	.....	109.2	.....	.....	.....	.....	111.5	.....	.....	.....	170.0	175.9	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	285.7	.....	.....	.....	.....	349.1	.....	.....	.....	469.1	461.5	.....	.....	.....	.....	.....
.....	.....	.....	.....	176.5	.....	.....	.....	.....	237.1	.....	.....	.....	299.1	285.6	.....	.....	.....	.....	.....
.....	.....	.....	.....	109.2	.....	.....	.....	.....	111.5	.....	.....	.....	170.0	175.9	.....	.....	.....	.....	.....
.....	.....	.....	.....	285.7	327.2	281.1	291.8	324.3	349.1	374.4	387.3	430.8	469.0	461.4	458.7	438.3	453.3	511.7	593.0
.....	.....	.....	.....	176.5	206.0	194.2	193.6	210.2	237.5	255.5	260.8	281.7	299.1	285.6	263.8	254.4	256.1	290.6	.....
.....	.....	.....	.....	109.2	121.2	86.9	98.2	114.1	111.6	118.9	126.5	149.1	169.9	175.8	194.9	183.9	197.2	221.1	.....

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TABLE IV–A–1–E.—*Enrollment in Soviet*
[All figures

		(a) 1928	(b) 1929	(c) 1930	(d) 1931	(e) 1932	(f) 1933	(g) 1934	(h) 1935	(i) 1936	(j) 1937	(k) 1938	(l) 1939	(m) 1940	(n) 1941	(o) 1942
1. Engineering-industrial (total)	T	52.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	204.6	.....	.....
	R	52.3	62.8	130.3	197.3	233.4	188.3	198.8	193.9	175.6	170.5	194.6	201.5	176.8	.....	.....
	E	(a)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27.8	.....	.....
A. Industry and construction	T	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	168.4	.....	.....
	R	.....	.....	112.0	160.5	187.4	148.7	157.1	152.7	136.7	133.7	153.9	160.5	.....	.....	.....
	E	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
B. Transportation and communication	T	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36.2	.....	.....
	R	.....	.....	18.3	36.8	46.0	39.6	41.7	41.2	38.9	36.8	40.7	40.0	.....	.....	.....
	E	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2. Agricultural	T	26.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	52.1	.....	.....
	R	26.9	34.0	44.7	57.5	62.2	54.2	61.3	63.5	58.5	53.3	62.5	56.6	45.7	.....	.....
	E	(a)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.4	.....	.....
3. Socioeconomic	T	16.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36.2	.....	.....
	R	16.5	18.3	21.7	30.7	34.3	38.2	31.1	30.8	29.5	30.1	26.8	27.7	22.5	.....	.....
	E	(a)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13.7	.....	.....
4. Educational-cultural and arts (total)	T	45.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	408.9	.....	.....
	R	45.5	49.9	47.8	76.4	93.5	88.5	113.1	120.0	138.5	149.4	196.7	221.1	230.2	.....	.....
	E	(a)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	178.7	.....	.....
A. Education (universities, pedagogical and teachers' institutes) and cultural	T	39.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	398.6	.....	.....
	R	39.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	189.2	212.8	220.7	.....	.....
	E	(a)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	177.9	.....	.....
B. Arts	T	6.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.3	.....	.....
	R	6.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	7.5	8.3	9.5	.....	.....
	E	(a)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.8	.....	.....
5. Medical and health (including physical culture)	T	25.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	109.8	.....	.....
	R	25.6	26.1	27.6	32.1	46.4	47.7	61.4	76.3	85.3	91.2	109.9	113.0	109.8	.....	.....
	E	(a)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	(a)	.....	.....
6. Actual Total	T	166.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	811.6	.....	.....
	R	166.8	191.1	272.1	394.0	469.8	416.9	465.7	484.5	487.4	494.5	590.5	619.9	585.0	.....	.....
	E	(a)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	226.6	.....	.....
7. Other fields (CP schools) or unaccounted residual	T	9.8	56.0	.....	.....	.....	73.2	.....	.....	.....	.....	.....	250.0	(a)	.....	.....
	R	9.8	13.1	18.9	36.0	38.9	45.4	56.1	40.1	48.3	54.0	12.4	(a)	(a)	.....	.....
	E	(a)	42.9	.....	.....	.....	32.8	.....	.....	.....	.....	.....	250.0	(a)	.....	.....
8. Actual Grand Total	T	176.6	247.1	.....	.....	.....	495.1	.....	.....	.....	.....	.....	869.9	811.7	.....	.....
	R	176.6	204.2	291.0	430.0	508.7	462.3	521.8	524.6	535.7	548.5	602.9	619.9	585.0	312.8	227.0
	E	(a)	42.9	.....	.....	.....	32.8	.....	.....	.....	.....	.....	250.0	226.7	.....	.....
9. Reported Grand Total	T	176.6	204.2	287.9	405.9	504.4	458.3	527.3	563.5	542.0	547.0	602.9	619.9	811.7	.....	.....
	R	176.6	204.2	287.9	405.9	504.4	458.3	527.3	563.5	542.0	547.0	602.9	619.9	585.0	.....	.....
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	226.7	.....	.....

[a] None.

T—Total. R—Regular. E—Extension-correspondence.

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higher educational establishments, 1928–59
in thousands]

(p) 1943	(q) 1944	(r) 1945	(s) 1946	(t) 1947	(u) 1948	(v) 1949	(w) 1950	(x) 1951	(y) 1952	(z) 1953	(aa) 1954	(bb) 1955	(cc) 1956	(dd) 1957	(ee) 1958	(ff) 1959
.....	.....	187.3	.....	.....	.....	.....	320.7	.....	.....	.....	572.6	649.6	.....	.....	847.0	.....
.....	.....	.....	204.4	.....	.....	239.3	268.2	.....	.....	.....	.....	497.7	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	52.5	.....	.....	.....	.....	151.9	.....	226.0	270.4	.....
.....	.....	158.0	.....	.....	.....	.....	272.8	.....	.....	.....	489.2	550.6	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	29.3	.....	.....	.....	.....	47.9	.....	.....	.....	83.4	99.0	.....	.....	.....	.....
.....	.....	.....	33.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	49.8	.....	.....	.....	.....	104.1	.....	.....	.....	173.3	195.9	.....	222.0	232.0	.....
.....	.....	.....	60.3	.....	.....	78.7	89.4	.....	.....	.....	.....	150.0	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	14.7	.....	.....	.....	.....	45.9	.....	.....	.....	.....
.....	.....	44.5	.....	.....	.....	.....	89.2	.....	.....	.....	105.8	106.7	.....	.....	158.0	.....
.....	.....	.....	31.5	.....	.....	38.0	43.1	.....	.....	.....	.....	47.3	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	46.1	.....	.....	.....	.....	59.4	.....	.....	.....	.....
.....	.....	333.0	.....	.....	.....	.....	621.9	.....	.....	.....	733.9	756.0	.....	.....	730.0	.....
.....	.....	.....	220.4	.....	.....	312.0	336.3	.....	.....	.....	.....	380.5	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	285.6	.....	.....	.....	.....	375.5	.....	.....	.....	.....
.....	.....	321.9	.....	.....	.....	.....	607.0	.....	.....	.....	719.7	741.6	.....	.....	715.0	.....
.....	.....	.....	207.1	.....	.....	298.9	322.1	.....	.....	.....	.....	368.0	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	284.9	.....	.....	.....	.....	373.6	.....	.....	.....	.....
.....	.....	11.1	.....	.....	.....	.....	14.9	.....	.....	.....	14.2	14.4	.....	.....	15.0	.....
.....	.....	.....	13.3	.....	.....	13.1	14.2	.....	.....	.....	.....	12.5	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.7	.....	.....	.....	.....	1.9	.....	.....	.....	.....
.....	.....	115.6	.....	.....	.....	.....	111.5	.....	.....	.....	144.9	158.8	.....	.....	183.0	.....
.....	.....	.....	136.7	.....	.....	105.6	108.1	.....	.....	.....	.....	152.4	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	3.4	.....	.....	.....	.....	6.4	.....	.....	.....	.....
.....	.....	730.2	.....	.....	.....	.....	1247.4	.....	.....	.....	1730.5	1867.0	.....	.....	2150.0	.....
.....	.....	.....	653.3	.....	.....	774.5	845.1	.....	.....	.....	.....	1227.9	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	402.3	.....	.....	.....	.....	639.1	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	(a)	.....	.....	.....	.....	(a)	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	(a)	.....	.....	.....	.....	(a)	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	(a)	.....	.....	.....	584.0	(a)	.....	.....	.....	.....
.....	.....	730.2	.....	.....	.....	.....	1247.4	.....	.....	.....	1730.5	1867.0	.....	.....	.....	.....
320.8	440.8	539.2	.....	.....	.....	.....	845.1	.....	.....	.....	1146.5	1227.9	.....	.....	.....	.....
.....	.....	191.0	.....	.....	.....	.....	402.3	.....	.....	.....	584.0	639.1	.....	.....	.....	.....
.....	.....	730.2	871.7	963.6	1032.1	1132.1	1247.4	1356.1	1441.5	1562.0	1730.5	1867.0	2001.0	2099.6	2179.0	2267.0
.....	.....	539.2	649.5	705.6	734.4	778.2	845.1	918.2	971.5	1042.7	1146.5	1227.9	1278.0	1320.3	1333.0	1342.0
.....	.....	191.0	192.2	258.0	297.7	353.9	402.3	437.9	470.0	519.3	584.0	639.1	723.0	779.3	846.0	925.0

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TABLE IV–A–1–G.—*Graduations from Soviet higher educational establishments, 1928–60*

[All figures in thousands]

		(a) 1928	(b) 1929	(c) 1930	(d) 1932	(e) 1932	X-1 1 FYP, 1929–32 Total	X-1 1 FYP, 1929–32 Per annum	(f) 1933	(g) 1934	(h) 1935	(i) 1936	(j) 1937	X-2 2 FYP, 1933–37 Total	X-2 2 FYP, 1933–37 Per annum	(k) 1938	(l) 1939	(m) 1940	X-3 3 FYP, 1938–40 Total	X-3 3 FYP, 1938–40 Per annum	(n) 1941	(o) 1942	(p) 1943	(q) 1944
1. Engineering-industrial (total)	T	8.9	11.0	20.8	18.8	17.1	67.7	16.92	17.9	18.9	37.2	35.8	34.6	134.4	26.88	31.3	28.4	30.1	89.8	29.93	.....	.....	.....	.....
	R	8.9	11.0	20.8	18.8	17.1	67.7	16.92	17.9	18.9	37.2	35.8	34.6	134.4	26.88	31.3	28.4	29.4	89.1	29.70	27.5	13.4	9.7	9.3
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	0.7	0.7	0.23	.....	.....	.....	.....
A. Industry and construction	T	.....	.....	.....	.....	14.5	.....	.....	6.1	14.9	29.6	29.2	27.6	107.4	21.48	25.4	(22.4)	24.2	72.0	24.00	.....	.....	.....	.....
	R	.....	.....	.....	.....	14.5	.....	.....	6.1	14.9	29.6	29.2	27.6	107.4	21.48	25.4	(22.4)	23.5	(71.3)	23.76	.....	.....	.....	.....
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	0.7	(0.7)	0.23	.....	.....	.....	.....
B. Transportation and communication	T	.....	.....	.....	.....	2.6	.....	.....	1.8	4.0	7.6	6.6	7.0	27.0	5.40	5.9	(6.0)	5.9	17.8	5.93	.....	.....	.....	.....
	R	.....	.....	.....	.....	2.6	.....	.....	1.8	4.0	7.6	6.6	7.0	27.0	5.40	5.9	(6.0)	5.9	(17.8)	5.93	.....	.....	.....	.....
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	negl.	negl.	negl.	.....	.....	.....	.....
2. Agricultural	T	6.4	7.0	6.7	8.5	8.4	30.6	7.65	4.8	6.3	8.8	10.4	11.3	41.6	8.32	10.2	10.7	10.3	31.2	10.40	.....	.....	.....	.....
	R	6.4	7.0	6.7	8.5	8.4	30.6	7.65	4.8	6.3	8.8	10.4	11.3	41.6	8.32	10.2	10.7	10.1	(31.0)	10.33	8.0	6.2	1.9	2.3
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	0.2	(0.2)	0.07	.....	.....	.....	.....
3. Socioeconomic	T	2.0	4.8	4.8	5.0	3.3	17.9	4.47	2.5	2.5	5.0	6.4	5.0	21.4	4.28	5.9	5.9	5.7	17.5	5.83	.....	.....	.....	.....
	R	2.0	4.8	4.8	5.0	3.3	17.9	4.47	2.5	2.5	5.0	6.4	5.0	21.4	4.28	5.9	5.9	4.9	(16.7)	5.56	.....	.....	.....	.....
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	0.8	(0.8)	0.27	.....	.....	.....	.....
4. Educational-cultural and arts (total)	T	5.2	5.7	7.2	11.6	10.1	34.6	8.65	10.5	7.9	12.5	21.6	31.7	84.2	16.8	37.9	39.6	62.5	(140.0)	46.66	.....	.....	.....	.....
	R	5.2	5.7	7.2	11.6	10.1	34.6	8.65	10.5	7.9	12.5	21.6	31.7	84.2	16.8	37.9	39.6	40.5	(118.0)	39.33	47.6	25.4	5.9	15.2
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	22.0	(22.0)	7.33	.....	.....	.....	.....
A. Education (universities, pedagogical and teachers' institutes) and cultural	T	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20.9	31.1	.....	.....	37.2	(38.6)	61.6	(137.4)	45.80	.....	.....	.....	.....
	R	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20.9	31.1	.....	.....	37.2	(38.6)	39.6	(115.4)	38.47	.....	.....	.....	.....
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	22.0	22.0	7.33	.....	.....	.....	.....
B. Arts	T	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.7	0.6	.....	.....	0.7	(1.0)	0.9	2.6	0.86	.....	.....	.....	.....
	R	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.7	0.6	.....	.....	0.7	(1.0)	0.9	(2.6)	0.86	.....	.....	.....	.....
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	negl.	negl.	.....	.....	.....	.....	.....
5. Medical and health (including physical culture)	T	6.2	4.0	4.4	6.5	4.3	19.2	4.80	4.6	2.5	7.5	9.2	12.3	36.1	7.22	12.9	13.7	17.4	44.0	14.60	.....	.....	.....	.....
	R	6.2	4.0	4.4	6.5	4.3	19.2	4.80	4.6	2.5	7.5	9.2	12.3	36.1	7.22	12.9	13.7	17.4	(44.0)	14.60	17.7	21.2	9.3	9.7
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
6. Actual Total	T	28.7	32.5	43.9	50.4	43.2	170.0	42.50	30.3	38.1	71.0	83.4	94.9	317.7	63.5	98.2	98.3	126.1	322.5	107.50	.....	.....	.....	.....
	R	28.7	32.5	43.9	50.4	43.2	170.0	42.50	30.3	38.1	71.0	83.4	94.9	317.7	63.5	98.2	98.3	102.2	(298.6)	99.53	104.7	68.9	27.8	35.7
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	23.9	23.9	7.97	.....	.....	.....	.....
7. Other fields (CP schools) or unaccounted residual	T	.....	.....	.....	.....	.....	.....	.....	4.3	11.1	12.7	14.2	9.9	52.2	10.44	5.7	(a)	(a)	5.7	1.90	.....	.....	.....	.....
	R	.....	.....	.....	.....	.....	.....	.....	4.3	11.2	12.7	14.2	9.9	52.2	10.44	5.7	(a)	(a)	5.7	1.90	.....	.....	.....	.....
	E	.....	.....	.....	.....	.....	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.....	.....	.....	.....
8. Actual Grand Total	T	.....	.....	.....	.....	.....	.....	.....	34.6	49.2	83.7	97.6	104.8	369.9	73.98	103.8	98.3	126.1	328.2	109.40	.....	.....	.....	.....
	R	.....	.....	.....	.....	.....	.....	.....	34.6	49.2	83.7	97.6	104.8	369.9	73.98	103.8	98.3	102.1	304.3	101.43	.....	.....	.....	.....
	E	.....	.....	.....	.....	.....	.....	.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	23.9	23.9	7.97	.....	.....	.....	.....
9. Reported Grand Total	T	28.7	32.5	43.9	50.4	43.2	170.0	42.50	34.6	49.2	83.7	97.6	104.8	369.9	73.98	103.8	98.3	126.1	328.3	109.43	.....	.....	.....	.....
	R	28.7	32.5	43.9	50.4	43.2	170.0	42.50	34.6	49.2	83.7	97.6	104.8	369.9	73.98	103.8	98.3	102.2	304.3	101.43	.....	.....	.....	.....
	E	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	23.9	24.0	8.00	.....	.....	.....	.....

[a] None; negl.—negligible; ( )—figures derived as residuals. T—Total. R—Regular. E—Extension-correspondence.

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		X-4							X-5						X-6		XX					
			War Years 1941–45						4 FYP, 1946–50						5 FYP, 1951–55							
		(r) 1945	Total	Per annum	(s) 1946	(t) 1947	(u) 1948	(v) 1949	(w) 1950	Total	Per annum	(z) 1951	(y) 1952	(z) 1953	(aa) 1954	(bb) 1955	Total	Per annum	Total 1928–1955	(cc) 1956	(dd) 1957	(ee) 1958	(ff) 1959	(gg) 1960
1. Engineering-industrial (total)	T	10.1	70.8	14.16	.....	.....	.....	.....	36.1	134.1	26.82	44.0	47.0	46.0	55.7	65.9	258.7	51.74	764.4	70.7	83.1	93.6	108.6	111.0
	R	9.9	.....	.....	.....	.....	.....	.....	34.8	.....	.....	.....	.....	.....	52.9	62.2	.....	.....	.....	.....	.....	.....	.....	.....
	E	0.2	.....	.....	.....	.....	.....	.....	1.3	.....	.....	.....	.....	.....	2.8	3.7	.....	.....	.....	.....	.....	.....	.....	.....
A. Industry and construction	T	8.5	54.2	10.84	.....	.....	.....	.....	30.0	112.9	22.58	.....	.....	.....	47.7	56.4	219.0	43.80	642.1	61.0	70.8	79.4	92.3	95.0
	R	8.3	.....	.....	.....	.....	.....	.....	28.9	.....	.....	.....	.....	.....	45.3	53.2	.....	.....	.....	.....	.....	.....	.....	.....
	E	0.2	.....	.....	.....	.....	.....	.....	1.1	.....	.....	.....	.....	.....	2.4	3.2	.....	.....	.....	.....	.....	.....	.....	.....
B. Transportation and communication	T	1.6	16.6	3.32	.....	.....	.....	.....	6.1	21.2	4.24	.....	.....	.....	8.0	9.5	39.7	7.94	122.3	9.7	12.3	14.2	16.3	16.0
	R	1.6	.....	.....	.....	.....	.....	.....	5.9	.....	.....	.....	.....	.....	7.6	9.0	.....	.....	.....	.....	.....	.....	.....	.....
	E	negl.	.....	.....	.....	.....	.....	.....	0.2	.....	.....	.....	.....	.....	0.4	0.5	.....	.....	.....	.....	.....	.....	.....	.....
2. Agricultural	T	2.9	21.7	4.34	.....	.....	.....	.....	12.7	45.3	9.06	.....	.....	.....	20.1	24.1	91.5	18.30	268.3	26.2	29.8	30.9	34.5	34.7
	R	2.9	.....	.....	.....	.....	.....	.....	12.4	.....	.....	.....	.....	.....	19.3	23.0	.....	.....	.....	.....	.....	.....	.....	.....
	E	negl.	.....	.....	.....	.....	.....	.....	0.3	.....	.....	.....	.....	.....	0.8	1.1	.....	.....	.....	.....	.....	.....	.....	.....
3. Socioeconomic	T	2.4	12.1	2.42	.....	.....	.....	.....	11.4	38.8	7.67	.....	.....	.....	15.9	15.6	71.2	14.24	180.9	18.7	20.2	24.0	25.0	24.7
	R	1.4	.....	.....	.....	.....	.....	.....	8.6	.....	.....	.....	.....	.....	9.6	9.0	.....	.....	.....	.....	.....	.....	.....	.....
	E	1.0	.....	.....	.....	.....	.....	.....	2.8	.....	.....	.....	.....	.....	6.3	6.6	.....	.....	.....	.....	.....	.....	.....	.....
4. Educational-cultural and arts (total)	T	32.6	135.0	27.00	.....	.....	.....	.....	96.7	324.7	64.94	.....	.....	.....	125.5	123.3	612.2	122.44	1335.9	124.1	109.2	116.2	140.4	141.5
	R	28.5	.....	.....	.....	.....	.....	.....	72.2	.....	.....	.....	.....	.....	75.5	73.1	.....	.....	.....	.....	.....	.....	.....	.....
	E	4.1	.....	.....	.....	.....	.....	.....	24.5	.....	.....	.....	.....	.....	50.0	50.2	.....	.....	.....	.....	.....	.....	.....	.....
A. Education (universities, pedagogical and teachers' institutes) and cultural	T	32.0	131.4	26.28	.....	.....	.....	.....	94.1	316.1	63.22	.....	.....	.....	123.1	120.8	599.4	119.88	1308.3	.....	106.4	113.6	138.0	139.1
	R	27.9	.....	.....	.....	.....	.....	.....	69.6	.....	.....	.....	.....	.....	73.2	70.7	.....	.....	.....	.....	.....	.....	.....	.....
	E	4.1	.....	.....	.....	.....	.....	.....	24.5	.....	.....	.....	.....	.....	49.9	50.1	.....	.....	.....	.....	.....	.....	.....	.....
B. Arts	T	0.6	3.6	0.72	.....	.....	.....	.....	2.6	8.6	1.72	.....	.....	.....	2.4	2.5	12.8	2.56	27.6	.....	2.8	2.6	2.4	2.4
	R	0.6	.....	.....	.....	.....	.....	.....	2.5	.....	.....	.....	.....	.....	2.3	2.4	.....	.....	.....	.....	.....	.....	.....	.....
	E	(a)	.....	.....	.....	.....	.....	.....	0.1	.....	.....	.....	.....	.....	0.1	0.1	.....	.....	.....	.....	.....	.....	.....	.....
5. Medical and health (including physical culture)	T	6.6	62.4	12.48	.....	.....	.....	.....	20.0	109.1	21.82	.....	.....	.....	17.5	16.8	87.8	17.56	364.8	20.2	24.2	26.0	29.5	30.0
	R	6.6	.....	.....	.....	.....	.....	.....	19.9	.....	.....	.....	.....	.....	17.0	16.2	.....	.....	.....	.....	.....	.....	.....	.....
	E	(a)	.....	.....	.....	.....	.....	.....	0.1	.....	.....	.....	.....	.....	0.5	0.6	.....	.....	.....	.....	.....	.....	.....	.....
6. Actual Total	T	54.6	302.0	60.40	.....	.....	.....	.....	176.9	652.0	130.40	.....	.....	.....	234.7	245.7	1121.4	224.28	2914.4	259.9	266.5	290.7	338.0	342.0
	R	49.3	.....	.....	.....	.....	.....	.....	147.9	.....	.....	.....	.....	.....	174.3	183.5	.....	.....	.....	.....	.....	.....	.....	.....
	E	5.3	.....	.....	.....	.....	.....	.....	29.0	.....	.....	.....	.....	.....	60.4	62.2	.....	.....	.....	.....	.....	.....	.....	.....
7. Other fields (CP schools) or unaccounted residual	T	.....	.....	.....	.....	.....	.....	.....	(a)	.....	.....	.....	.....	.....	.....	.....	.....	.....	57.9	.....	.....	.....	.....	.....
	R	.....	.....	.....	.....	.....	.....	.....	(a)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	E	.....	.....	.....	.....	.....	.....	.....	(a)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8. Actual Grand Total	T	.....	.....	.....	.....	.....	.....	.....	176.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	2972.3	.....	.....	.....	.....	.....
	R	.....	.....	.....	.....	.....	.....	.....	147.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	E	.....	.....	.....	.....	.....	.....	.....	29.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
9. Reported Grand Total	T	54.6	302.0	60.40	76.0	98.5	138.0	162.6	176.9	652.0	130.40	201.4	219.2	220.2	234.8	245.8	1121.4	224.28	2972.3	260.0	267.0	290.0	338.0	342.0
	R	49.2	286.0	57.20	67.3	86.3	121.5	138.3	147.9	561.0	112.20	168.4	175.8	172.0	174.4	183.8	874.4	174.88	2594.4	191.0	194.5	213.3	253.7	.....
	E	5.4	16.0	3.20	8.7	12.2	16.5	24.3	29.0	91.0	18.20	33.0	43.4	48.2	60.4	62.0	247.0	49.40	377.9	69.0	72.5	76.7	84.3	.....

X-1, X-2, X-3, X-4, X-5, X-6, XX—Summations for the respective plan periods.

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GENERAL NOTES TO TABLES IV–A–1–A, IV–A–1–E, AND IV–A–1–G

Tables IV–A–1–A, IV–A–1–E and IV–A–1–G compose one unit. In these three tables, academic years are broken up into calendar years. For instance, figures for first-year acceptances in 1950–51 are given in the column marked 1950 in Table IV–A–1–A. Figures on enrollment in 1950–51 are given in the column marked 1950 in Table IV–A–1–E. Figures on graduations in 1950–51 are given in the column marked 1951 in Table IV–A–1–G. Places in the table in the Sources and Notes which follow are indicated by a checkerboard code with small letters and numbers. Fields of specialized training are defined in Appendix IV–B–1 below, and other details are in Ch. IV of the text.

Enrollment in, acceptances in, and graduations from higher educational establishments are grouped in Rows 1–5 of each table into five branches[3] as follows:

Row 1. Engineering, which includes institutes training specialists in (Sub-row A): machine building, civil, mechanical engineering, power, electrical, mining, metallurgical, petroleum, chemical engineering, food engineering, aviation, architecture, construction, light industry, lumber; and (Sub-row B): transportation, communication (radio and electronics) engineering. Prior to 1932 "engineering economics" in all these fields[4] were included in the category of engineering.

Row 2. Agriculture, which includes institutes training agronomists, veterinarians, all specialists on land conservation, electrification and mechanization of agriculture;[5] forestry specialists.

Row 3. Socioeconomic, which includes economics, law, planning, accounting, banking, trade and distribution specialists, archival and statistical experts, economists.

Row 4. Education, which includes institutes training (Sub-row A): university-trained specialists, university teachers, trainees of pedagogical institutes, teachers' institutes, foreign language institutes, and (Sub-row B): art schools (conservatories, theatrical schools, etc.).

Row 5. Health, which includes institutes training specialists in medicine (both therapeutic and preventive), some dentistry, pharmacy; physical culture and sports instructors and professional coaches.

Row 6 in each table gives the totals for Rows 1 through 5.

Row 7 in each table gives figures on enrollment, acceptances and graduations of Higher Communist Schools *(Kom VUZ—Kommunisticheskie Vysshie Uchebnye Zavedeniia)* and Higher Communist Agricultural Schools *(VKSKhSh—Vysshie Kommunisticheskie Sel'skokhoziaistvennye Shkoly)*, which were considered to be higher educational establishments in the 1930's. The two abbreviations *Kom VUZ* and *VKSKhSh* are used in this appendix to designate these training establishments. In some years this category also includes industrial academies *(promyshlennye akademii).*

Row 8 in each table gives the totals for Rows 6 and 7.

Row 9 in each table gives the official grand totals as reported by Soviet sources, without distribution of acceptances, enrollment or graduations by field.

Each of the above rows has three subdivisions: T—Total, R—Regular and E—Extension-correspondence acceptances, enrollment or graduations in each of the tables respectively. The term "regular"—R—refers to the Soviet concept of "permanent" *(statsionarnye)* higher educational establishments, which means that day and evening students are included. Until the mid–1950's evening students did not account for an appreciable proportion of regular students. Extension-correspondence refers to the similar Russian term *(zaochnye).* For further details, see the Sources and Notes below as well as the discussion in the text.

Tables IV–A–1–A, IV–A–1–E and IV–A–1–G were constructed in such a way as to incorporate all the pertinent data which were released by Soviet authorities during the period 1955–60, as well as those already presented in *SPM,* pp. 298–313. Some of the earlier data reported in *SPM* are presented *not* in Tables IV–A–1–A, IV–A–1–E or IV–A–1–G directly but are delegated to the Supplements to these tables, which follow in the Sources and Notes below.

The Sources and Notes are given for each table separately, i.e., for Table IV–A–1–A, for Table IV–A–1–E, and finally for Table IV–A–1–G.

SOURCES AND NOTES TO TABLE IV–A–1–A (ACCEPTANCES)

Place in Table — Sources and Discussion

1–8TRE, a–k (28–38).—*Kul't Stroi–1940,* p. 111. The same series, 1928–38, is presented by Bartosek, *Vysoké,* pp. 25–26. It is assumed that there were no extension course acceptances, although throughout this period in fact there was a negligible number of extension students.

General note to 1–8 TR a–k (28–38).—In addition, a check of various plans reveals that the figures accepted from *Kul't Stroi–1940* are duplications of actually reported annual acceptance figures. Unless figures refer to preliminary reporting, they are consistent on the whole with those adopted here. All TsUNKhU statistical handbooks and especially Gosplan annual and 5–year plans prior to 1938 were used for checking purposes (see bibliography).

9TRE, a–m (28–40).—*KS–1956,* pp. 201–04. This source states explicitly that the data on extension students (acceptances, graduations, enrollment) are not reported prior to 1938. *9E* for all years was derived as a residual.

1–9TRE m (40).—*KS–1956,* pp. 212–13.

1–6R m (40).—As an approximation, the figures reported in *KS–1956* check with those in Bartosek, *Vysoké,* p. 25.

1–6R 1, n–q (39, 41–44).—Bartosek, *Vysoké,* p. 25. Figures on total acceptances in 1942, 1943 *(6R* o, p) are also identical with Voznesenskii, *Voennaia,* p. 116.

6R m (40).—Confirmed by statement in *VVSh,* No. 4, 1951, p. 9, which states that, excluding correspondence students, acceptances in 1940 were 161,400. *Pravda,* May 27, 1940 (feature), states that anticipated acceptances, including all types of extension students, were 280,000, of which anticipated acceptances in regular higher educational establishments were to be 183,000. Apparently these planned targets were revised downward.

1R m–q (40–44).—Confirmation of figures from Bartosek, *Vysoké,* p. 25, may be found in *VVSh,* No. 1, 1946, p. 1, which reveals identical figures for engineering acceptances for all these years.

6R q (44).—Confirmation of Bartosek's figure in *Trud,* June 20, 1944. Anticipated acceptances are 170,000.

1–8TRE r (45).—*KS–1956,* pp. 212–13.

1–6R r (45).—As approximations, the figures estimated on the basis of the data given in Bartosek, *Vysoké,* p. 25, and presented in *SPM,* p. 307, are close to those now reported in *KS–1956.*

9TR r–bb (45–55).—*KS–1956,* pp. 201–04.

9E r–bb (45–55).—Derived as a residual.

For the post-war period a comparison of the estimates for annual acceptances presented in *SPM,* pp. 298–99 and those in the new official series is as follows:

[3] I. M. Bogdanov, *Statistika kul'tury* (Statistics of Culture), Moscow, 1950, esp. pp. 68–73. This breakdown is also due partly to the survival of the institutional setting in higher education. Prior to 1936, different people's commissariats were directly in charge of the training of specialists in higher education and institutions were classified in accordance with the occupation of the specialists they were training.

[4] Since the number of "engineer-economists" in the years prior to 1932 was small both in training and on the job, the inclusion of this group does not lead to any considerable error. In the years after 1932 the majority of this group is included under "economists" in the category "socioeconomic."

[5] Again a small, unappreciable error arises because specialists (engineers) in the mechanization of agriculture were included, prior to 1931, under the category of "engineers" (i.e., industrial). Thereafter they are included with agricultural field students.

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Table Column	Row 9T KS	Row 9T SPM	Row 9R KS	Row 9R SPM	Row 9E KS	Row 9E SPM
r (45)	285.7	.....	176.5	177.0	109.2	.....
s (46)	327.2	.....	206.0	195.0	121.2	.....
t (47)	281.1	.....	194.2	187.0	86.9	.....
u (48)	291.8	.....	193.6	173.0	98.2	.....
v (49)	324.3	320.0	210.2	197.0	114.1	123.0
w (50)	349.1	350.0	237.5	235.7	111.6	114.3
x (51)	374.4	355.0	255.5	245.0	118.9	110.0
y (52)	387.3	375.0	260.8	240.0	126.5	135.0
z (53)	430.8	415.0	281.7	.....	149.1	.....
aa (54)	469.0	450.0	299.1	287.0	169.9	163.0
bb (55)	461.4	.....	285.6	.....	175.8	.....

The major source of discrepancies is due to the extension-correspondence component in the annual acceptances. The differences in totals are minor.

1–8TRE w, aa, bb (50, 54, 55).—*KS–1956*, pp. 212–13. Regular entrants include evening students, the relative proportion of whom among all acceptances is small.

9TRE cc (56).—*NKh–1957*, p. 251.

1–6T cc, dd, ee (56–58).—*NarKhoz–1959*, p. 836. The totals in 6T differ slightly from those compiled from miscellaneous sources.

1–6T ee (58).—The figures in the table are adopted from *NarKhoz–1959*, p. 836. A slightly different set of figures is reported in *NarKhoz–1960*, p. 746, and a comparison of these two sets is as follows:

Row in table	NarKhoz–1959	NarKhoz–1960
1 T	181.5	181.9
1AT	152.2	152.5
1BT	29.0	29.4
2 T	56.6	57.1
3 T	38.1	38.0
4 T	145.2	146.9
4AT	141.3	143.0
4BT	3.9	3.9
5 T	31.9	32.0
6 T	453.3	455.9

Presumably the figures in *NarKhoz–1959* are a preliminary tabulation while those in *NarKhoz–1960* are the final tabulation. Note that it has been observed in general that the later year statistical handbook editions often have a slightly revised set of figures than those which appear in the handbook for the year for which the figures are reported.

9TRE cc, dd, ee (56–58).—*NarKhoz–1959*, p. 835. Additional figures for 1957 and 1958 have been reported in the Soviet press as follows:

Vestnik statistiki, No. 5, 1959, p. 86, reports total acceptances in 1957 as 438,300, which is the same figure as is used in Table IV–A–1–A. This figure, however, is to be contrasted with the words "slightly more than 400,000" first-year anticipated acceptances reported in *VVSh*, No. 9, 1958, p. 3.

Izvestia, Dec. 24, 1958 (Eliutin's speech to the Supreme Soviet). The same figure is given in *Eliutin–VSSS–1959*, p. 86. *Vestnik statistiki*, No. 5, 1959, p. 86, reports 1958 acceptances as 453,300, as compared with the 438,000 reported in Table IV–A–1–A from the above indicated sources.

1–6T ff (59).—*NarKhoz–1960*, p. 746.

9TRE ff (59).—*NarKhoz–1960*, p. 745. In addition, prior to the release of this handbook, the Soviet press reported total acceptance figures as follows:

Radio Moscow, June 30, 1959 (talk by Eliutin, Minister of Higher and Secondary Specialized Education), reports anticipated 1959 acceptances as 485,000, of whom extension and evening students will account for 268,000 and day students 217,000. This compares with a total of 448,000 acceptances in 1958—237,000 extension and evening students and 211,000 day students.

Pravda, Aug. 31, 1959, reports 1959 acceptances were 470,000 total, with 270,000 evening and extension students. Allowing 50,000 for evening acceptances, we obtain the figure 220,000 for extension students, as reported in Table IV–A–1–A.

Note to 9RE dd, ee, ff (57, 58, 59).—Because of the sharp decline in regular higher education acceptances, the compensatory role of evening division acceptances, which are included with the "regular" division students, becomes quite conspicuous. Since 1957, Russian sources have begun to emphasize acceptances of students *"bez otryva ot proizvodstva"* (part-time, without leaving the job), a concept which incorporates *both* extension-correspondence students and evening students. For further discussion of this statistical problem, see the text in Ch. IV. Figures by type of program are given in Summary Table IV–A–1–S.

9T gg (60).—*SSSR–Tsif–1960*, p. 308.

Supplement to Table IV–A–1–A

In addition to the post-war figures which appear in Table IV–A–1–A, the earlier study (*SPM*, p. 299) presented estimates of annual acceptances as follows:

	(Figures in Thousands)								
	(s) 1946	(t) 1947	(u) 1948	(v) 1949	(w) 1950	(x) 1951	(y) 1952	(z) 1953	(aa) 1954
1R Engineering total	.....	43.0	45.0	.....	70.0	.....	.....	.....	106.8
2R Agricultural	16.0	17.0	16.0	.....	22.4	.....	.....	.....	27.6
3R Socioeconomic	.....	13.0	13.0	.....	.....	.....	.....	.....	.....
4R Educational-cultural	.....	92.0	82.0	.....	.....	.....	.....	.....	.....
5R Health	.....	22.0	17.0	.....	20.0	22.0	.....	.....	.....
6R(9R) Total	195.0	187.0	173.0	197.0	235.7	245.0	240.0	.....	287.0
6E(9E) Extension	.....	.....	.....	123.0	114.3	110.0	135.0	.....	163.0
6T(9T) Grand Total	.....	.....	.....	320.0	350.0	355.0	375.0	415.0	450.0

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SOURCES AND NOTES TO SUPPLEMENT TO TABLE IV–A–1–A

These data were estimated from primary sources as follows:

Place in Table *Sources and Discussion*

6R s (46).—VVSh, Nos. 11–12, 1946, p. 3 (Kaftanov article). Actual acceptances of 195,000 in VUZ. The plan was fulfilled.

2R s (46).—Sotsialisticheskoe zemledelie, July 9, 1946.

1–6R t (47).—Moscow News, May 14, 1947, gives the following breakdown of anticipated fall acceptances for 1947:

Total		187,000
Engineering		43,000
Agricultural		17,000
Educational		90,000
Pedagogical	66,000	
Universities	24,000	
Medical (health)		20,000
Total		170,000
Unaccounted		17,000

This unaccounted residual is composed of the socio-economic, arts and physical culture segments. It was assumed that arts accounted for 2,000; physical culture for 2,000; and the residual 13,000 were socioeconomic segment acceptances. Thus, health, 22,000; socioeconomic, 13,000; education (including arts), 92,000.

6R t (47).—VVSh, No. 4, 1947, p. 2, states that actual acceptances were 187,000. *Gudok,* Mar. 2, 1947 (1947 annual plan) states that planned acceptances in 1947 were to be 182,300, excluding extension students. Apparently both planned and anticipated acceptances were realized.

1–6R u (48).—Komsomol'skaia pravda, Mar. 13, 1948. The figures in the table refer to planned acceptances in the fall of 1948.

6R u (48).—By addition. *Komsomol'skaia pravda,* Mar. 13, 1948, reveals that the total acceptances would be 180,000. Consequently 7,000 remained undistributed or unaccounted for. *Nar Khoz SBX,* No. 2 (Itogi, 3d quarter, 1948), states that *actual* acceptances in the fall of 1948 were 188,000. Thus the actual acceptances were above plan by about 4–5 percent. No adjustment was made.

6R v (49).—Izvestia, Sept. 6, 1949. Acceptances exclude extension students.

6T v (49).—NarKhoz SBX, No. 3, p. 435 (Itogi, 3d quarter, 1949), explicitly states that extension student acceptances are included.

6E v (49).—As a residual *(6T v* minus *6Rv)*

1R w (50).—VVSh, No. 4, 1951, p. 9, states that acceptances in the field of industrial and construction engineering in 1950 were 175 percent of those in 1940. In the fields of transportation and communication engineering, they were 151 percent of those in 1940. Assuming 1940 acceptances given in the table, we obtain 1950 acceptances as about 70,000.

2R w (50).—VVSh, No. 4, 1951, p. 10, states that acceptances in agricultural fields in 1950 were 243 percent of those in 1940. Consequently, they were about 22,400. *Komsomol'skaia pravda,* Sept. 1, 1950, states the *anticipated* acceptances as about 21,000.

6R w (50).—VVSh, No. 4, 1951, p. 9, states that the total acceptances, *excluding* extension students, were 235,700 in 1950.

6T w (50).—NarKhoz SBX, No. 4, p. 414 (Itogi, 3d quarter, 1950), states that total acceptances in VUZ, including extension students, were 350,000. Another source *(Moskovskii Komsomolets,* Aug. 31, 1950) states that acceptances in 1950 were about 335,000 (or about 15,000 less than the figure accepted for this table from the Gosplan report).

6E w (50).—As a residual *(6Tw* minus *6Rw).*

5R w (50).—Meditsynskii rabotnik, Nov. 16, 1950, states that fall acceptances in all medical VUZ were ovor 20,000.

5R x (51).—Meditsynskii rabotnik, Sept. 2, 1951, specifies fall acceptances in all medical VUZ were over 20,000.

6E x (51).—Pravda, July 12, 1951, states that extension students accepted "last year" were 110,000.

6R x (51).—Since total acceptances, including extension students, are given (355,000) and since extension student acceptances were 110,000, as a residual *6Rx* equals 245,000.

6T x (51).—Komsomol'skaia pravda, Sept. 1, 1951; *VVSh,* No. 10, 1951, p. 1, state that acceptances in 1951, including extension students, were over 350,000.

6R y (52).—Pravda, Sept. 1, 1952; *Izvestia,* June 19, 1952. Figure in the table (240,000) refers to regular VUZ acceptances only.

6E y (52).—Derived as a residual.

6T y (52).—Acceptances in the fall of 1952 were 375,000 in all types of VUZ *(Pravda,* Oct. 6, 1952 [Malenkov speech]).

6T z (53).—Pravda, Jan. 31, 1954 (Itogi 1953). Actual acceptances in 1953 were 25,000 less than the planned acceptances of 440,000 in 1954 *(Pravda,* May 11, 1954 [Eliutin article, Minister of Higher Education]). Actual acceptances in the fall were over 400,000 *(Izvestia,* Nov. 3, 1953).

1–3R aa (54).—Pravda, Nov. 13, 1954 (Eliutin article). Engineering student acceptances in 1954 were 2.6-fold over those in 1940. Since 1940 acceptances were about 41,000, 1954 engineering field acceptances were 106,800. Agricultural field acceptances were 3-fold over those in 1940. Since 1940 acceptances were 9,200, 1954 acceptances were 27,600. Engineering student acceptances accounted for 37.2 percent of all acceptances in regular VUZ (i.e., excluding extension students); consequently, regular VUZ acceptances were about 287,000.

6T aa (54).—Actual acceptances in 1954 were 450,000 *(Pravda,* Sept. 1, 1954). This exceeds planned acceptances by 10,000, since fall 1954 acceptances were planned as 440,000 in all types of VUZ *(Pravda,* May 11 and 19, 1954).

6E aa (54).—As a residual.

SOURCES AND NOTES TO TABLE IV–A–1–E (ENROLLMENT)

Place in Table *Sources and Discussion*

1–6TR a (28).—Kul't Stroi–1935, on pp. 42, 73, 276, and *Podgotovka,* pp. 13, 65, present the data incorporated into this table. The former gives rounded figures, the latter up to the unit (which is not significant, of course). *NarKhoz–1932,* pp. 512–13, presents the same data, only universities are not broken down by field:

	Enrollment
Industrial VUZ	49,000
Agricultural VUZ	24,400
Socioeconomic VUZ	7,300
Pedagogical VUZ	17,800
Art VUZ	6,400
Universities (all faculties and divisions)	52,100
Medical VUZ	9,800
Total	166,800

Thus universities, pedagogical and art VUZ accounted for 76,300 students, or 30,800 more than in the table, where these students are redistributed by branches of study in accordance with the institutional classification of later years.

Note that there weren't any extension-correspondence students in that year.

9TRE a–m (28–40).—KS–1956, pp. 201–02. Note particularly the differences in the figures in rows 8T and 9T for some years during this period. These differences originate mainly from the fact that the highest agricultural schools (VKSKhSh) in some instances are included, in others excluded from the total. Kom VUZ (CP higher schools) are apparently *always* included in the totals reported in *KS–1956. KS–1956,* p. 202, states also (in reference to row 9E) that the reporting of extension-correspondence students begins with the academic year 1938–39, that is, after the governmental decree of August 28, 1938, which stipulated the reorganization of extension-correspondence training. The first actual statistic about extension-correspondence students, however, refers to 1940. *KS–1956* does not reveal detailed breakdowns of enrollment for this period and

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reports only total enrollment. Statistical compilations presented in *SPM*, pp. 298–313, were relied upon instead.

7TR a (28).—*Kul't Stroi–1940*, p. 105, gives total enrollment including Kom VUZ, as 176,600; actual accounted total is 166,800 and consequently Kom VUZ alone had an enrollment of about 9,800. There were no industrial academies or VKSKhSh. It is known that a year before that, Kom VUZ enrollment was 8,400 (*Sots Stroi–1936*, p. 572) and therefore this estimate appears to be a consistent one. Bartosek, *Vysoké*, p. 23, gives the figure 9,600 for Kom VUZ.

8TR a (28).—By addition, see discussion above.

1-6R b (29).—*Pogotovka*, pp. 42,65,131, as quoted in Gorokhoff, *Materials*, pp. 36–57. The data presented here refer to Jan. 1, 1930. Although agricultural enrollment (*2Rb*) is said to exclude mechanical engineers on the mechanization of agriculture, it probably does include them. *NarKhoz–1932*, p. 512, gives for (*2Rb*) an agricultural enrollment figure, Nov. 1, 1929, as 31,400, and states (p. 667) that it does include mechanical engineers on the mechanization of agriculture. *Kul't Stroi–1935*, p. 276, gives a slightly different distribution of students as of Nov. 1, 1929—apparently there the agricultural segment excludes these mechanization engineers (*2Rb*, agricultural—23,100 and *1Rb*, engineering—74,000). In the latter source universities are broken up even further than in *Podgotovka*. *NarKhoz–1932*, p. 512, gives university enrollment with no breakdown by field as 53,400. All sources, including *KS–1956*, p. 201, agree on total enrollment.

7R b (29).—*Kul't Stroi–1940*, p. 105, gives total enrollment including Kom VUZ as 204,200 and therefore Kom VUZ enrollment as a residual is 13,100.

7E b (29).—*Podgotovka*, p. 101, as quoted by Gorokhoff, *Materials*, p. 35a.

8TRE b (29).—By addition. Note *KS–1956* does not report extension-correspondence students.

1–6R c (30).—*Kul't Stroi–1934*, p. 39, which agrees closely with the figures given in *Podgotovka*, p. 13. However, the latter source, p. 65, gives a somewhat different distribution, especially for the agricultural and engineering segments, which total to about the same figure (175,000–178,000). *NarKhoz–1932*, p. 512, breaks up universities, and distribution of enrollment given there approximately agrees with figures adopted in this table. All sources agree on total enrollment (*6Rc*).

7R c (30).—*Kul't Stroi–1940*, p. 105, gives total including Kom VUZ as 287,900 (identical with figure in *KS–1956*, p. 201). Since 6R is 272,100, Kom VUZ accounted for about 15,800. *Kul't Stroi–1935*, p. 274, gives the slightly higher total of 295,500 on the basis of which the Kom VUZ enrollment appears to have been about 23,400. Finally, *Sots Stroi–1934*, p. 406; *Sots Stroi–1935*, p. 616, give Kom VUZ enrollment as 18,900. The latter figure was adopted for this table.

8R c (30).—By addition; see also discussion above.

1–6R d (31).—*Sots Stroi–1936*, p. 573. There is no ambiguity as to the categories of enrollment. *3Rd* was derived as a residual. Mechanical engineers on the mechanization of agriculture definitely are included in the agricultural segment (*2Rd*) in this year and all subsequent years. *1Rd* (total engineering enrollment) agrees also with the figure given in *Kul't Stroi–1935*, p. 276, and it is quite close to the figure given in *Podgotovka*, p. 13 (201,400). *2Rd*, *5Rd* are identical with the figures stated in the latter source and in *Kul't Stroi–1934*, pp. 192–93. Similarly educational (*4Rd*) is in close agreement with both sources. *Kul't Stroi–1935*, p. 276, states that *4Rd* is 75,600, and in addition there were 4,200 in arts, which totals to 79,200, or slightly higher than the figure (76,400) adopted for this table. Total enrollment (*6Rd*) is in agreement with all sources named above.

7R d (31).—This figure is obtained from *Sots Stroi–1936*, pp. 572–73. It is stated that Kom VUZ and VKSKhSh had 30,500 and industrial academies 5,500 students. Total is 36,000. *Kul't Stroi–1940*, p. 105, gives the total (*9Rd*) enrollment in regular higher educational establishments, Kom VUZ, and industrial academies as 405,900, which is the figure also reported in *KS–1956*, p. 201. Subtracting the regular higher educational establishment enrollment (394,000) from this total, we ascertain that enrollment in Kom VUZ and industrial academies was about 11,900 students and Kom VUZ alone was about 6,400.

8R d (31).—By addition. See discussion in 7Rd above. This total (430,000) is higher than the one which appears in *Kul't Stroi–1940*, p. 105, and *KS–1956*, p. 201 (405,900), due to the inclusion of VKSKhSh students.

1–6R e (32).—*Sots Stroi–1934*, p. 407, reports enrollment as Jan. 1, 1933 (i.e., end of 1932 in this table). There is no ambiguity since all students are distributed by segments of study and no derivations or adjustments of any sort are required. Total engineering enrollment (*1Re*) agrees with figure given in *Kul't Stroi–1935*, p. 274, and total enrollment (*6Re*) agrees with the figure given on pp. 66–67 of the same source. Data presented in *Podgotovka*, p. 13, were discarded, since it is explicitly stated that they refer to *preliminary* reporting (figures given there are slightly higher).

7R e (32).—This figure can be derived in a variety of ways. *Kul't Stroi–1940*, p. 105, gives the total enrollment in higher education as 512,100 (including industrial academies). Since we know the total in all regular higher educational establishments (469,800), we can derive (*7Re*) as a residual—42,300. *Vtoroi FYP*, vol. I, p. 515, states that industrial academies had 8,200, VKSKhSh 22,500 and Kom VUZ 8,500, which totals to 39,200. *Sots Stroi–1935*, p. 616, states that the Kom VUZ and VKSKhSh had 31,000 students and *Kul't Stroi–1940*, p. 105, reveals that in industrial academies there were 7,900, which totals to 38,900. *Kul't Stroi–1935*, p. 274, reveals the total enrollment as 513,400, and subtracting (*6Re* equals 469,800), we obtain 43,600. Thus this enrollment was anywhere between 38,900 and 43,600. For this table we assumed the lower figure. Bartosek, *Vysoké*, p. 23, gives this figure as 41,200.

8R e (32).—By addition; see also discussion above. Note that in this case *KS–1956*, p. 201, reports the total enrollment as 504,400 (*9Re*) which certainly contains some categories of schools not included in the reporting a year earlier (in 1931).

1–6R f (33).—*Plan 1935*, p. 687, gives actual enrollment as of the end of 1933 distributed by field, except the socio-economic segment (*3Rf*), which was derived as a residual. *2Rf*, *4Rf*, *5Rf*, *6Rf* (total enrollment) are identical with figures given in *Kul't Stroi–1935*, p. 68, but this source reveals the engineering total as 175,100 (industry 135,500 and transportation 39,600, the latter agreeing with figure adopted for this table).

7R f (33).—*Kul't Stroi–1940*, p. 105, reveals the total including Kom VUZ and industrial academies as 464,200. *Kul't Stroi–1935*, p. 68, reveals this aggregate enrollment as 453,000. Consequently, assuming regular enrollment (*6Rf*) as 416,900, we obtain a residual of about 36,000 for enrollment in Kom VUZ and industrial academies. *Plan 1935*, pp. 687–88, reveals that industrial academies had an enrollment of 7,400; VKSKhSh 32,000, and Kom VUZ 6,000, which totals to 45,400. The latter figure was accepted for this table.

8R f (33).—By addition; see also discussion above.

7E f (33).—*Kul't Stroi–1934*, pp. 48–50. The figure is derived by addition of extension and evening students (*bez otryva ot proizvodstva*). This figure is most likely biased upward due to double counting. Extension students only accounted probably for about 20,000–25,000. This statistic is absent in *KS–1956*, p. 201.

8TRE f (33).—By addition.

1–6R g (34).—There are 11 sets of figures on enrollment available for this year. This was a year of extensive reorganization of higher educational establishments and apparently there was such chaos that most figures disagree with one another by anywhere from 2,000 to 10,000. These discrepancies, though significant *per se*, shed very little light upon enrollment as a whole and therefore no attempt was made to unscramble the enrollment for each category as to why or how it appeared. In the first place, all figures pertaining to fall enrollment (i.e., October reporting), ex-

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cept the socioeconomic segment, were discarded, since this is the time when the reorganization turmoil was taking place. The figures which were accepted in this table are from *Plan 1936*, vol. I, pp. 458–59, where actual enrollment at the end of 1934 is given. Figures for *1Rg, 2Rg, 4Rg, 5Rg, 6Rg* differ in this source only by the first decimal place of a thousand from those presented in *Kul't Stroi–1935*, p. 68. The latter refers to Jan. 1, 1935, thus being of about the same reporting date. From the first source, *3Rg* (socioeconomic segment) can be determined as a residual and equals 38,100. The latter source (pp. 80–85), however, reveals that (October 1934) enrollment in the socioeconomic segment was 31,600. Another source, *Kul't Stroi–1934*, pp. 46–50, reveals that enrollment in arts was 7,000. The residual (38,100) apparently contains both arts and socioeconomic segment enrollment. Thus 31,100 was allocated to the socioeconomic segment and 7,000 to arts, which was incorporated into the educational enrollment (106,100 plus 7,000 equals 113,100). These figures were used in the table, and the remainder were adopted from *Plan 1936*.

7R g (34).—*Plan 1936*, vol. I, pp. 458–59, gives the following enrollment in other than regular higher educational establishments:

Industrial academies	8,200
VKSKhSh	40,100
Kom VUZ	7,800
Total	56,100

This figure was adopted for 7Rg.

8R g (34).—The sum of breakdowns of enrollment by field (1–7Rg) equals 521,800. This figure differs somewhat from other officially reported totals. *Kul't Stroi–1940*, p. 105, reports 533,600; *Kul't Stroi–1934*, p. 274, reports it as 513,800; and the postwar statistical handbook (*KS–1956*, p. 201) reports it as 527,300.

1–6R h (35).—*Plan 1937*, pp. 148–49, gives the actual enrollment in 1935 at the end of the year. All figures except *3Rh* were obtained from it. The accepted figures check closely with those which were reported by *Kul't Stroi–1935*, p. 68, but are consistently lower than the ones reported by the same source (p. 71) but which refer to October 1935 reporting date. *Sots Stroi–1936*, p. 573, gives figures based on preliminary reporting and again they are slightly higher than those accepted here. *3Rh* was obtained as a residual, which was 37,800, 7,000 of which were in arts, and consequently the socioeconomic segment enrollment was 30,800 and the educational figure (including arts) was adjusted by 7,000 to a total of 120,000.

7R h (35).—*Plan 1937*, pp. 148–49, reveals the following enrollment:

Industrial academies	6,800
VKSKhSh	27,300
Kom VUZ	6,000
Total	40,100

This figure was adopted for *7Rh*.

Kul't Stroi–1935, p. 68, reveals total enrollment including all Kom VUZ as 515,900, which gives a residual of 31,400 for *7Rh*. *Kul't Stroi–1935*, p. 71, gives the total enrollment as 523,400, which gives a residual of 39,900. *Kul't Stroi–1935*, p. 275, gives the total as 576,300, which apparently includes also schools for administrative and party apparatus (ordinarily excluded from this series). Residual in the latter case is 91,800, which can be broken up if we consider the data given by *Sots Stroi–1936*, pp. 572–73, which reveal:

Industrial academies	9,200
VKSKhSh	36,200
Kom VUZ	6,800
Schools for administrative and party apparatus	37,600
Total	89,800

which is quite close to this residual. Finally, *Kul't Stroi–1940*, p. 105, gives total enrollment including all types of other schools as 569,400, giving a residual of 84,900. It is obvious that schools for administrative and party apparatus were included in these two latter total enrollments to conceal the fact that enrollment in 1934 and 1935 was not expanding, but remained about stationary.

8R h (35).—By addition; see discussion above.

1–6R i (36).—For 1936 because of a lack of any other data on enrollment the preliminary reporting figures had to be accepted. *Plan 1937*, pp. 146–47, reveals the preliminary reporting of actual enrollment at the end of 1936. These figures were accepted for this table, *3Ri* was derived as a residual (36,500) which was then distributed—29,500 for the socioeconomic segment and 7,000 for arts students. The latter was incorporated into educational enrollment and this increased the originally stated figure (131,500) to 138,500.

7R i (36).—*Plan 1937*, pp. 146–47, states the actual enrollment in other than regular higher educational establishments at the end of 1936 according to preliminary reporting as follows:

Industrial academies	8,300
VKSKhSh	33,600
Kom VUZ	6,400
Total	48,300

Kul't Stroi–1940, p. 105, states that total enrollment, including VKSKhSh and industrial academies, was 548,700, of which 6,700 were in industrial academies. This gives a residual of 61,300. Apparently the schools for administrative and party apparatus are again included in this total. If this is the case, this enrollment figure would have been about 23,000, which seems plausible. Since we exclude schools for administrative and party apparatus in this series, the first figure (48,300) was accepted.

8R i (36).—By addition; see discussion above.

1–7R j (37).—In order to ascertain actual enrollment in 1937 we have to compare actual vs. planned enrollment revealed by two sources. The actual enrollment is given in *Tretii FYP*, p. 237, and the planned one in *Plan 1937*, pp. 148–49.

		Actual 1937 (year end)	*Planned 1937 (year end)*
(8Rj)	Aggregate	553,400	555,500
	of which:		
1Rj	Industrial engineering	133,700	126,700
1Rj	Transportation engineering	36,800	37,500
2Rj	Agricultural	53,300	57,100
4Rj	Educational	141,400	147,500
5Rj	Health	91,200	94,600
	Subtotal	456,400	463,400
	Residual (8Rj) minus subtotal	97,000	92,100
	of which:		
(7Rj)	Industrial academies	6,200	9,200
	VKSKhSh	(*)	36,800
	Kom VUZ	(*)	8,000
	Subtotal	6,200	54,000
	Residual	90,800	38,100

*Unknown

In the case of 1937 planned enrollment, this last residual certainly includes only two items—arts and socioeconomic enrollment. In the case of 1937 actual enrollment, this last residual contains VKSKhSh and Kom VUZ enrollments and in addition probably some schools for administrative and party apparatus (which, as we have already shown above, were included in some previous years). Consequently we assumed for 1937 that there were about 30,100 students in the socioeconomic segment and about 8,000 in arts (this latter enrollment was also true for 1938). These figures, which probably are somewhat higher than actual enrollment, are nevertheless close approximations of it.

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These figures were introduced in the table; arts enrollment was aggregated with education as it always has been. Furthermore, planned figures were also assumed for *7Rj*.

8R j (37).—Total is by addition (thus excluding schools for administrative and party apparatus). This is the last year in which party schools give trouble in enrollment statistics.

1–7R k (38).—For this year there is no trouble in obtaining comprehensive distribution figures. The figures in the table refer to Sept. 15, 1938, and are from *Sots Stroi–1933–38*, p. 121. This also gives a breakdown for the socioeconomic segment (trade, 5,600; economics and administrative, 21,200). Industrial academies and Kom VUZ are singled out (12,400); the latter can be broken down from *Kul't Stroi–1940*, p. 105, industrial academies, 7,700 and the remainder Kom VUZ, 4,700. A check from *Kul't Stroi–1940*, p. 105 ff., reveals about the same distribution of enrollment by field.

1–7R l (39).—Comprehensive distribution is given by *BSE–SSSR, 1947*, column 1233, *Kul't Stroi–1940*, p. 256.

3R l (39).—*Pravda*, June 18, 1940 (Strumilin article), states that in 1939–40 there were 24,268 students in economic VUZ and industrial academies. This is lower than the figure of 27,700 accepted in the table, but it shows the magnitude of enrollment in economic VUZ alone.

6R l (39).—*Pravda*, May 17, 1940 (editorial). On Nov. 1, 1939 (date stated), total enrollment in VUZ was 619,900. *Pravda*, June 18, 1940 (Strumilin article), states that there were somewhat more than 600,000 students at the "present time" i.e., 1939–40). Same figure (slightly over 600,000) is given by Kaftanov (*Pravda*, Sept. 2, 1939).

7E l (39).—*BSE–SSSR*, 1947, column 1233, states that there were about 250,000 extension students.

8TRE l (39).—By addition.

1–9T m (40).—*KS– 1956*, pp. 206–207.

1–9R m (40).—*NKh–1957*, p. 253; *Vestnik statistiki*, No. 6, 1956, p. 96.

1–9E m (40).—Derived as a residual.

1–6R m (40) supplement.—In the original version (*SPM*, p. 305) the actual enrollment in 1940 was estimated as follows. Sinetskii, *PP Kadry*, gives the average number of students per full-time faculty member (p. 111) and faculty staffs (p. 108) on the basis of which the 1940 enrollment can be computed:

	Field	*Average number of students per 10 faculty members*	*Faculty*	*Enrollment*
1R(A)m	Engineering industrial	150	10,100	151,500
1R(B)m	Engineering transportation	120	2,300	27,600
2R m	Agricultural	80	5,500	44,000
3R m	Socioeconomic	140	1,500	21,000
4R(A)m	Education	100	18,200	182,000
4R(B)m	Arts	50	1,400	7,000
5R m	Health	110	10,300	113,300
6R m	Total	.....	.....	546,400
	All fields	110	49,300	542,300
	Unaccounted	110	700	7,700

It is obvious that this computation is only a rough approximation, because of rounding of both average number of students per faculty member and faculty staffs. The last row, "unaccounted," results from the discrepancy in Sinetskii's charts on p. 104 and p. 108. This computation turned out to be sufficiently accurate, as it is possible to check now on the basis of the reporting in *KS–1956* and other sources. As it turned out, however, the figure of 582,000 regular students which appeared in various Soviet sources, referring to enrollment in the academic year 1940–41, was the closest one to the total enrollment now reported in *KS–1956*, pp. 202, 206.

Note to 8R m (40).—The Baltic provinces, which were annexed in 1939, could account for about 20,000 to 25,000 students. (Actually the 1941 planned enrollment was 23,500, *Plan 1941*, pp. 708, 715, 722.) It is likely that enrollment in the Baltic provinces was not included in the USSR total enrollment in 1939, but that it was counted in 1940. This consideration is important for detailed comparisons of enrollment figures in the years 1938–40.

8R n (41).—Gorokhoff, *Materials*, p. 56b.

8R o (42).—Total enrollment was 227,000 (Ashby, *Scientist in Russia*, p. 69, as quoted from *VVSh*, No. 2, 1945, p. 27). Same figure in Bartosek, *Vysoké*, p. 24.

8R p (43).—Gorokhoff, *Materials*, p. 56b.

8R q (44).—P. F. Yudin (ed.), *Strany mira* (Countries of the World), Moscow, 1946, p. 172. About the same figure (455,000) is given in Ashby, *Scientist in Russia*, p. 69. Bartosek, *Vysoké*, p. 24, gives figure of 455,000.

Note to 8R n-q.—The recently published (1956–60) Soviet statistical handbooks do not reveal any new data in regard to the war years. In fact, in all the tables examined by the author, the reporting for the years 1941–44 was entirely omitted.

1–8T r (45).—*KS–1956*, pp. 206–07.

9TRE r-bb (45–55).—*KS–1956*, pp. 201–02. The comparison of figures presented in *SPM*, pp. 298–99, where most of the figures were estimated or derived from Soviet sources (for details see *Sources and Notes* to Table A–1, Appendix Ch. IV, *SPM*, pp. 306–13), can now be made with the official reporting in *KS–1956* as follows:

Table Column	*Year End*	*Row 9T*		*Row 9R*		*Row 9E*	
		KS	*SPM*	*KS*	*SPM*	*KS*	*SPM*
r	1945	730.2	704.2	539.2	539.2	191.0	165.0
s	1946	841.7	865.3	649.5	653.3	192.2	212.0
t	1947	963.6	983.0	705.6	689.0	248.0	294.0
u	1948	1032.1	1004.0	734.4	734.0	297.7	270.0
v	1949	1132.1	1120.5	778.2	774.5	353.9	346.0
w	1950	1247.4	1247.0	845.1	841.0	402.3	406.0
x	1951	1356.1	1365.0	918.2	950.0	437.9	406.0
y	1952	1441.5	1442.0	971.5	942.0	470.0	500.0
z	1953	1562.0	1562.0	1042.7	1062.0	519.3	500.0
aa	1954	1730.5	1732.0	1146.5	1087.0	584.0	645.0
bb	1955	1867.0	.....	1227.9	.....	702.0	.....

Although there are some differences between the two series, particularly in regard to regular and extension-correspondence enrollments, these differences seldom exceed 10 per cent.

1–6R s (46).—*Actual* enrollment in 1946–47 (i.e., 1946 in the table) was estimated in the following way. Sinetskii, *PP Kadry*, p. 111, gives the average number of students per faculty member in higher educational establishments in a given field. The same source (p. 105) also reveals the number of faculty members. The following are the data and the computation of actual enrollment based thereon:

	Field	*Average number of students per 10 faculty members*	*Faculty*	*Enrollment*
1R(A)s	Engineering industrial	105	16,300	171,200
1R(B)s	Engineering transportation	133	2,500	33,200
2R s	Agricultural	90	6,700	60,300
3R s	Socioeconomic	121	2,600	31,500
4R(A)s	Education	95	21,800	207,100
4R(B)s	Arts	46	2,900	13,300
5R s	Health	97	14,100	136,700
6R s	Total	N.A.	N.A.	653,300
6R s	All fields	97	67,300	652,800

The discrepancy between the two last rows is obviously due to rounding. It was officially revealed in *KS–1956*, p. 201, that regular enrollment was 649,500. Furthermore, if we work systematically through *PP Kadry*, we obtain the following figures.

1R s (46).—Sinetskii, *PP Kadry*, p. 107. As of Jan. 1, 1947, there were 207,100 (against 204,400 derived above) engineering students of all types, which was 31.5 percent of the total number of students. Consequently the total number of students was 652,300.

2R s (46).—Sinetskii, *PP Kadry*, p. 110. Total number of agricultural students was 61,400 (against 60,300 derived).

4(A)R s (46).—Sinetskii, *PP Kadry*, p. 105. Total number of

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students in educational fields was 199,800, or 30.7 percent of the total enrollment. Consequently the total enrollment is estimated as 650,800.

4(B)R s (46).—Sinetskii, *PP Kadry*, p. 100. Enrollment in arts was 13,400.

5R s (46).—Sinetskii, *PP Kadry*, p. 109. Enrollment in medical schools alone was 131,800. Of course this figure differs slightly from that which was derived above by computing enrollment figures from teaching staffs and average number of students per faculty member. The figure computed above (in *1–6 Rs*), i.e., 136,700, was incorporated into this table.

1–6R s (46) (check).—There are additional checks available. *VVSh*, No. 1, 1946, p. 1, states that the contemplated enrollment in engineering (*1Rs*) would be over 200,000. *Sotsialisticheskoe Zemledelie*, July 9, 1946, states that the planned enrollment in agricultural fields (*2Rs*) would exceed 50,000 in the fall of 1946. *BSE-SSSR*, 1947, column 1237, states that the 1946–47 total enrollment (*6Rs*) would be 632,000. In the postwar years it is obvious that enrollment quotas were overfulfilled due to the influx of students whose study had been interrupted by the war.

6R s (46).—*Gudok*, Oct. 16, 1946 (Zverev, 1946 budget), states that toward the end of 1946 there would be 653,000 students enrolled in regular VUZ. *Medynskii–1952*, p. 162, also gives the actual 1946 enrollment as 653,000. Another statement confirms the figure accepted in this table. Zhirnov, *Kul'turnoe*, p. 24, states that *actual* enrollment in VUZ in 1946–47 was 648,900. The same source also states that the 1945 enrollment was 539,200. At the same time *Gudok*, Jan. 21, 1946 (Itogi, 1946), states that the total number of students enrolled in the VUZ increased between 1945 (fall) and 1946 (fall) by 109,000. Assuming the 1945 figure, we obtain 648,200 for 1946, which checks closely with the figure accepted in the table (653,300).

1–6R v (49).—*BSE* (2d ed.), vol. 9, p. 515. Three evening engineering schools are included in *1Rv*. Among *5Rv* are included 5,700 physical culture students. Total enrollment (*6Rv*) also given in *VVSh*, No. 12, 1949, p. 10.

1–9T w (50).—*KS–1956*, pp. 206–07.

1–9R w (50).—*NKh–1957*, p. 253; *Vestnik statistiki*, No. 6, 1956, p. 96.

1–9E w (50).—Derived as a residual.

1R w (50).—*BSE* (2d ed.), vol 9, p. 512, gives a detailed breakdown of enrollment by type of institution in engineering as of Sept. 15, 1950. In addition to 280,700, there were 40,700 extension students or 12.7 percent of the total 321,400 in engineering. Another estimate of the engineering enrollment is available. *VVSh*, No. 4, 1951, p. 8, states that the average technical VUZ had 1,690 students. *BSE* (2d ed.), vol. 9, p. 515, states that there were 167 technical VUZ. Consequently the 1950 enrollment may be estimated as 282,000. A somewhat lower figure (266,800) is given in *BSE* (2d ed.), vol. 9, p. 512, but it excludes certain categories of engineering students.

2R w (50).—*VVSh*, No. 4, 1951, p. 10, gives the figure of about 90,000.

2R z (53).—*Not on table. Pravda*, Oct. 6, 1953 (speech by Kaftanov, who reappeared as Assistant Minister of Culture), states that in 1953 there were 2.5 times as many agricultural students as in 1940. Assuming the number in 1940 to be 48,000, we obtain 122,000 for 1953.

1–9T aa (54).—*KS–1956*, pp. 206–07.

2R zz (54).—*Not on table. VVSh*, No. 11, 1954, p. 54, states that in 1954 there were 32,800 agricultural field extension students and that they represented 20 percent of all agricultural field students. Thus, all agricultural students would total 164,000, of whom regular accounted for 132,200 and extension for 32,800.

3R zz (54).—*Not on table. Izvestia*, Feb. 18, 1955, states that in the socioeconomic segment there were about 245,000 students, of whom 95,000 were extension students. Thus, there were 150,000 regular students. These figures refer to students in universities as well as to socioeconomic field institutes.

1–9T bb (55).—*KS–1956*, pp. 206–07.

1–9R bb (55).—*NKh–1957*, p. 253; *Vestnik statistiki*, No. 6, . .*1956*, p. 96.

1–9E bb (55).—Derived as a residual.

9TRE cc (56).—*NKh–1957*, p. 250; *Dos–1957*, p. 278.

1E dd, ee (57, 58).—*Eliutin–VSSS–1959*, p. 34. The same source also gives figures slightly different from those incorporated in the table for 1940, 1950 and 1955, i.e., 26,700, 52,300 and 150,600 respectively.

2T dd (57).—K. A. Ivanovich, *Sel'skokhoziaistvennoe obrazovanie v SSSR*. Moscow, 1958, p. 46.

9TRE dd (57).—*NarKhoz–1959*, p. 830; *SSSR–Tsif–1958*, p. 356. The latter source gives extension enrollment as 779,300. Another source (*VVSh*, No. 6, 1958, p. 3 [Eliutin article]) gives total enrollment as 2,100,000 and extension-correspondence *plus* evening division students as 880,000. Since there are 780,000 reported in extension-correspondence divisions, there are about 100,000 in evening divisions. *Eliutin–VSSS–1959*, p. 34, states explicitly that there were 127,400 students in evening divisions and 756,600 in extension-correspondence divisions, for a total of 884,000. *Vestnik statistiki*, No. 5, 1959, p. 86, while giving an identical grand total enrollment of 2,099,100, gives the figure for enrollment in evening and extension-correspondence programs of 906,000. Note that 779,300 plus 127,400 equals 906,700. The figures adopted in the table are: 9T—2,099,600; 9R—1,320,300; 9E—779,300.

1–6T ee (58).—The total enrollment for the fall of 1958 by branch was estimated on the basis of reporting in *Eliutin–VSSS–1959*, pp. 22, 24, 26, 28, 29, as follows:

	Actual Reporting		*Estimated figures*
Branch	*No.*	Per cent	
1. Engineering-industrial	839,000	39.4	847,000
2. Agricultural		10.8	232,000
3. Socio-economic		41.3	888,000
4. Educational-cult.	Note A		
5. Medical-health		8.5	183,000
	2,150,000	100.0	2,150,000

Note A.—The source states (pp. 24, 26) that there were 515,000 in pedagogical institutes and 200,000 in universities, which gives a total of 715,000 students. If in addition to the two categories of higher educational establishments in the educational-cultural branch the art students are considered, this would make about 15,000 more students. Thus the total would be 730,000. Consequently the socio-economic segment would account for 158,000 students (i.e., a total of 888,000 minus 730,000). This figure was incorporated into the table.

5T ee (58).—*Sovetskoe zdravookhranenie*, 1959, No. 5, p. 3, states that there were 160,000 medical students. This figure refers to *medical* higher education establishments *only* (i.e., excludes students in physical culture institutes). This figure was not used in Table IV–A–1–E proper.

9TRE ee (58).—*NarKhoz–1959*, p. 830, gives enrollment figures as follows: Total—2,179,000; regular day—1,180,000; evening—153,000; extension-correspondence—846,000. Thus "regular" enrollment as defined in table (day plus evening) was 1,333,000. Identical figures appear in *Vestnik statistiki*, No. 5, 1959, p. 86, where the total is reported as 2,178,900. *Pravda*, Sept. 17, 1958, gives the figure for total enrollment of 2,150,000 students. This figure was used in the calculation of 1–6T ee (*58*) above.

Eliutin–VSSS–1959, pp. 22, 34. This source reveals that there were 153,300 evening and 812,400 extension-correspondence students in the fall of 1958. *Molodoi kommunist*, 1958, No. 5, p. 71 (Eliutin interview), states that the anticipated enrollment in extension-correspondence and evening programs will be 950,000. Allowing for about 150,000 students in evening divisions, we obtain about 800,000 extension-correspondence students. Apparently the evening and extension acceptances were actually exceeded.

9 TRE ff (59).—*NarKhoz–1960*, p. 740.

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SUPPLEMENT TO TABLE IV–A–1–E.—*Total enrollment in Soviet higher educational establishments, 1914–28*

Year (Fall or year end)	Enrollment in all fields (thousands)	Year (fall or year end)	Enrollment in all fields (thousands)
1914	124.6	1924	165.3
1920	214.6	1925	162.0
1921	224.2	1926	160.4
1922	213.2	1927	159.8
1923	204.8	1928	166.8

Source: *Nar Khoz–1932*, p. 507. The enrollment excludes Communist Party higher educational establishments. The year 1928 provides a connection with Table IV–A–1–E.

SOURCES AND NOTES TO TABLE IV–A–1–G (GRADUATIONS)

Place in Table — *Sources and Discussion*

1–5, 9T a (28).—*Dos–1957*, p. 279.

1–8TRE a–k (28–38).—*Kul't Stroi–1940*, p. 112. The same figures are presented by Bartosek, *Vysoké*, pp. 25–26. For all years 1928–33 the figures adopted for this table are also identical with those presented in Beilin, *Kadry*, p. 313.

General note to 1–8TRE, a–k (28–38).—In addition, a check of various plans reveals that the figures accepted from *Kul't Stroi–1940* are duplications of actually reported annual graduation figures reported elsewhere. Unlike enrollment statistics, there is little trouble in reporting or compiling these graduation figures. Unless figures refer to preliminary reporting, they are consistent on the whole with those adopted here. All TsUNKhU statistical handbooks and especially Gosplan annual and 5-year plans prior to 1938 were used for checking purposes (see bibliography).

9TRE a–m (28–40).—*KS–1956*, p. 204.

1–8TRE m (40).—*KS–1956*, pp. 214–15.

1–5, 9T m (40).—Also in *Dos–1957*, p. 279.

X–1.—*KS–1956*, p. 216. The reported totals check with sum derived by addition of annual figures.

X–2.—*KS–1956*, p. 216. The communist party school graduates (7T, R) are included by this source in the education totals (4T, R). This inclusion accounts for the total of 136,400 in the education-cultural branch during the period 1933–37.

1–6R 1–r (39–45).—Bartosek, *Vysoké*, p. 26.

X–3.—*KS–1956*, p. 216.

1–6, 9TRE r (45).—*KS–1956*, pp. 214–15.

9TRE r–bb (45–55).—*KS–1956*, p. 204. A comparison of the data presented in this table for these years in the earlier study *SPM*, pp. 298–313, and those revealed in the new Soviet sources and incorporated into this table, is as follows (all figures in thousands):

Table Column	Year End	Row 9T KS	Row 9T SPM	Row 9R KS	Row 9R SPM	Row 9E KS	Row 9E SPM
r	1945	54.6	.....	49.2	50.2	5.4	.....
s	1946	76.0	.....	67.3	49.0	8.7	.....
t	1947	98.5	.....	86.3	92.0	12.2	.....
u	1948	138.0	.....	121.5	122.0	16.5	.....
v	1949	162.6	173.0	138.3	143.0	24.3	30.0
w	1950	176.9	173.0	147.9	148.0	29.0	25.0
x	1951	201.4	201.0	168.4	153.0	33.0	48.0
y	1952	219.2	221.0	175.8	180.0	43.4	41.0
z	1953	220.2	200.0	172.0	.....	48.2	.....
aa	1954	234.8	230.0	174.4	173.0	60.4	57.0
bb	1955	245.8	250.0	183.8	.....	62.0	.....

The estimates made in *SPM* were complicated by uncertainty as to the number of extension-correspondence graduates, but by and large the differences between these estimates and the new official data turned out to be minor.

1–9TRE w (50).—*KS–1956*, pp. 214–15.

1–5, 9T w (50).—Also in *Dos–1957*, p. 279.

X–4.—*KS–1956*, p. 216.

1–9TRE aa, bb (54, 55).—*KS–1956*, pp. 214–15.

1T w–cc (50–56).—*Dos–1957*, p. 281. This source has a table which compares U.S. and U.S.S.R. graduates in engineering. All figures are rounded to thousands (for 1954—56,000; for 1955—66,000 is given).

X–5.—*KS–1956*, p. 216. Totals are rounded in row 9T, R and E (actually 9E is 90,700).

XX.—The total number of graduates, 1928–55, is obtained by addition (1928 and X–1, X–2, X–3, X–4, X–5, and X–6). The totals *1T(B)* and *4T(B)*, however, are based on the respective figures in the periods X–2 through X–6 only, and *1T(A)* and *4T(A)* include *1T* and *4T* respectively for the years 1928 and X–1.

1–6T cc, dd, ee (56–58).—*NarKhoz–1959*, p. 838; *NKh–1957*, p. 252; *SSSR–Tsif–1958*, p. 357; *NarKhoz–1960*, p. 750.

9 TRE cc, dd, ee (56–58).—*NKh–1957*, p. 252; *NarKhoz–1959*, p. 837; *NarKhoz–1960*, p. 748.

1–6T ff (59).—*NarKhoz–1960*, p. 750.

9 TRE ff (59).—*NarKhoz–1960*, p. 748.

Note to 1–6 T ee ff (58–59).—Prior to the appearance of *NarKhoz–1959* and *NarKhoz–1960*, estimates of the 1958 and 1959 graduating classes were made on the basis of data complied from miscellaneous Soviet sources and on the basis of first-year acceptance figures by applying attrition rates. The resulting estimates for 1959 can now be compared with the official figures as follows:

	Estimate	Official reporting, NarKhoz–1960
1. Engineering-industrial	106.0	108.6
2. Agricultural	34.0	34.5
3. Socioeconomic	21.0	25.0
4. Educational	149.0	140.4
5. Health	30.0	29.5
6. Total	340.0	338.0

1–6T, 9T gg (60).—*SSSR–Tsif–1960*, p. 309. *Pravda*, July 13, 1960, gave a preliminary figure for *9T* of 350,000. *Pravda*, Oct. 28, 1959, gave for *1T* an anticipated figure of 119,000.

SUPPLEMENT TO TABLE IV–A–1–G

In addition to the postwar figures which appear in Table IV–A–1–G, *SPM*, pp. 299–313, presented the following figures and estimates:

	(s) 1946	(t) 1947	(u) 1948	(v) 1949	(w) 1950	(x) 1951	(y) 1952	(z) 1953	(aa) 1954	(bb) 1955
1R Engineering total	11.0	15.0	29.0	32.0	.....	30.0	30.0	40.0	53.0	.....
2R Agricultural	.....	8.0	.....	.....	.....	12.0	15.0	17.0	18.0	.....
3R Socioeconomic	.....	3.0	.....	.....	.....	11.0	13.0	.....	8.0	.....
4R Educational-cultural	.....	48.0	50.0	.....	.....	80.0	90.0	70.0	70.0	.....
5R Health	14.8	18.0	26.0	23.4	.....	20.0	32.0	.....	24.0	.....
6R(9R) Total	49.0	92.0	122.0	143.0	148.0	153.0	180.0	.....	173.0	.....
6E(9E) Extension	.....	.....	.....	30.0	25.0	48.0	41.0	.....	57.0	.....
6T(9T) Grand total	.....	.....	.....	173.0	173.0	201.0	221.0	200.0	230.0	250.0

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SOURCES AND NOTES TO SUPPLEMENT TO TABLE IV-A-1-G

Place in Table — *Sources and Discussion*

1R s (46).—*VVSh*, No. 1, 1946, p. 1. Expected graduations in 1946 were to be 11,000 in engineering.

5R s (46).—*Meditsynskaia sestra*, No. 1, 1947, p. 3.

6R s (46).—*BSE–SSSR*, 1947, column 1237—actual 1945–46 graduations (i.e., 1946) were 49,000.

1–6R t (47).—Total anticipated graduations 91,200 (*Gudok*, Mar. 2, 1947). *Moscow News*, May 28, 1947, reveals expected graduations as follows: engineering, 15,000; agricultural, 8,000; medical, 18,000; education (pedagogical institutes, 41,000; arts, 1,000; universities, 6,000), total 48,000; socioeconomic segment graduates as a residual. Confirmation of 1947 actual graduations is given in *Pravda*, July 7, 1947, as about 90,000. Confirmation of medical graduates can also be obtained, since *BSE–SSSR*, 1947, column 1178, states that planned graduations in 1947 would be between 17,000 and 18,000, a figure which was apparently realized.

1–5R u (48).—*Pravda*, June 27, 1948, gives figures on expected graduations by field. It states that total expected graduations would be 124,600 (see *6Ru* below). Unaccounted for are 19,600, which consists of agricultural, socioeconomic, and arts graduates.

5R u (48).—*Meditsynskii rabotnik*, Feb. 5, 1948, states also that anticipated graduations in 1948 will be 26,000. However, actual graduations were 24,000 (*ibid.*, Feb. 9, 1949). This figure, however, includes physicians only.

6R u (48).—*Pravda*, Jan. 20, 1949 (Itogi 1948), states that actual graduations were 122,000.

1R v (49).—*VVSh*, No. 1, 1946, p. 1. *Expected* graduations in engineering. It is stated that already (*uzhe*) after 1948, graduations would surpass the prewar level and would be 32,000.

5R v (49).—*Meditsynskii rabotnik*, Mar. 30, 1950, states that actual graduations in 1949 were 23,400 from medical VUZ. It is important to stress the fact that *Sovetskaia meditsyna*, No. 11, 1949, p. 4, states that the number of physicians increased by almost 30,000. Thus the increase in the number of physicians was probably larger than the influx of graduates due to the discharge of physicians from military duty.

6R v (49).—*VVSh*, No. 7, 1949, p. 1, states that actual graduations in 1949 were 143,000.

6E v (49).—*NarKhoz SBX*, No. 3, p. 428 (Itogi 1949, 2d quarter), states that in 1949 there were 60,000 extension student graduates from technicums and VUZ combined. It was assumed that of these, 30,000 graduated from technicums and 30,000 from VUZ.

6T v (49).—By addition.

6R w (50) 6E, 6T.—*VVSh*, No. 4, 1951, pp. 8–9. All figures refer to actual graduations in 1950.

1R x (51).—*Pravda*, May 24, 1951, states that 30,000 were preparing to graduate. *Komsomol'skaia pravda*, July 20, 1951, states that over 29,000 graduated.

2R x (51).—*Komsomol'skaia pravda*, July 20, 1951.

3R x (51).—Socioeconomic graduations are assumed to have been about 10,000 to 11,000.

4R x (51).—*Pravda*, May 24, 1951, states that about 80,000 were preparing for graduation. This includes universities. *Komsomol'skaia pravda*, July 20, 1951, gives "pedagogical and teacher institutes" alone as 66,000.

5R x (51).—*Meditsynskii rabotnik*, Jan. 4, 1951, states that anticipated graduations in medicine alone in 1951 will be 18,000. Consequently in all health fields, graduations would be about 20,000.

6R x (51).—Figure obtained by addition of actual figures and one (*3Rx*) estimate.

6T x (51).—*Pravda*, Jan. 29, 1952 (Itogi 1951), states that 201,000 were graduated. This apparently includes all extension graduates.

6E x (51).—Figure derived as a residual.

1–6R, 6E, 6T y (52).—*Pravda*, June 14, 1952 (feature), reveals the following breakdown of graduations:

Engineering	30,000
Agricultural	15,000
Pedagogical (alone)	70,000
Universities	15,000
Subtotal	130,000
Total graduations from regular VUZ	180,000
Unaccounted residual	47,000

Note to 5R y (52).—It is stated that this residual contains health, economics, jurisprudence, and arts graduates. We can single out the health field as about 32,000 in the following way. We know that between the end of 1951 (data from *Meditsynskii rabotnik*, Jan. 31, 1952) and the end of 1953 (data from *ibid.*, Aug. 14, 1953), the number of Soviet physicians increased by 58,000 (1951, 242,000; 1953, 300,000). Consequently the annual increase was in the neighborhood of 30,000. If annual losses are taken into consideration, graduations must have been somewhere between 30,000 and 33,000. We simply assumed graduations to have been about 32,000. Consequently there are 15,000 left for the socioeconomic and the arts segments. Arts graduates could have been anywhere between 1,000 and 2,000. We accepted them as 2,000. Consequently the socioeconomic segment alone is about 13,000 (*3Ry*). The educational segment (i.e., pedagogical 70,000, plus universities 18,000, plus arts about 2,000) was about 90,000 (*4Ry*). There is, however, some uncertainty about health field graduates since such high graduations from medical schools seem to be questionable in view of the following. The conversion to a 6-year medical curriculum began in 1945, and in each of the four subsequent years about 15 institutions were converted. Thus, in 1952 graduations should still be falling off rather than rising. In addition, 1951 anticipated graduations were reported to be about 18,000. Though the figures were retained in the table, only limited use will be made of them. Of course it is quite plausible that in 1952 an unusually large graduating class did in fact exist because of the influx of students whose studies had been interrupted by the war (the number of these graduates cannot be estimated on the basis of acceptance data since returning students are not reported as new acceptances).

6E y (52).—*Pravda*, June 14, 1952, states that in addition to the graduations given above, there were about 41,000 extension students graduated (presumably at least 70 percent of them in education).

6T y (52).—By addition, and as stated in the same source. Also stated in *Pravda*, Oct. 6, 1952 (Malenkov speech).

1, 2, 4R z (53).—*Izvestia*, July 15, 1953, reports *1R* as 40,000, *2R* as 17,000. The number of graduates of teacher and pedagogical institutes and universities was 67,000 (*4R*). This figure was adjusted upward by 3,000 to allow for arts graduates.

6T z (53).—*Izvestia*, Nov. 3, 1953, states that *actual* graduations in 1953 were about 200,000. This is the same figure as stated in *Pravda*, May 21, 1953, as anticipated graduations. It apparently includes all types of extension students.

1R z (53).—Actual graduations of engineers in 1953 were over 40,000 (*Pravda*, May 11, 1954, Eliutin articles).

1–6R, 6E, 6T aa (54).—*Pravda*, May 11, 1954, states that expected graduations in the summer of 1954 would be:

Grand total	230,000
Extension	57,000
Total (residual)	173,000
of which:	
Engineering	53,000
Agricultural	18,000
Universities	17,000
Pedagogical	53,000
Total	141,000
Unaccounted (which includes socio-economic, health, arts)	32,000

These 32,000, however, can be distributed as follows. *Narodnoe zdravookhranenie*, No. 10, 1954, p. 44, states that medical schools are graduating about 24,000 annually at the present time (i.e., 1954). Consequently *5R* is 24,000, and *3R*, as a residual, 8,000.

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6T aa (54).—Actual graduations in 1954 from all types of VUZ were about 230,000 (*Pravda*, July 5, 1954 [editorial]). Same figure is given in *Pravda*, May 19, 1954 (feature), where it it stated that this is the number who are taking graduation examinations.

6T bb (55).—Anticipated graduations, including extension students, in 1955 will be 250,000 (*VVSh*, No. 2, 1955, p. 1). This figure was confirmed as actual graduations (*Pravda*, June 25, 1955; *Izvestia*, June 25, 1955).

In retrospect it is important to note that although Soviet statistical news releases reveal figures which in some individual instances are somewhat different from those derived in the earlier study (the reader may wish to inspect the two sets), these differences do not invalidate the fundamental considerations in the approach of gathering information about the U.S.S.R. in the periods when statistics are scarce, to say the least. Fragmentary though they may be, these data, if arranged and examined carefully, provide a sufficiently consistent guide in the assessment of gross quantitative trends. At the same time, the number of empty spaces in this and other tables clearly suggests how meager Soviet statistical information still is despite what is regarded as a significant improvement in its flow during the period since 1956.

TABLE IV–A–2.—*Graduation rates in Soviet higher educational establishments, 1946–59*

[In thousands and per cent]

Acceptances				Assumed graduating classes				Graduation rates		
Year	Total	Reg.	Ext.	Year	Total	Reg.	Ext.	Total	Reg.	Ext.
1946	327.2	206.0	121.2	1950	176.9	147.9	29.0	54.0	71.8	23.9
				*1951	201.4	168.4	33.0	61.5	87.7	27.2
				Av.	.....	.....	.....	57.7	76.7	25.5
1947	281.1	194.2	86.9	1951	201.4	168.4	33.0	71.6	86.7	38.0
				*1952	219.2	175.8	43.4	77.8	90.5	49.7
				Av.	.....	.....	.....	71.3	88.6	43.8
1948	291.8	193.6	98.2	1952	219.2	175.8	43.4	75.1	90.8	44.0
				*1953	220.2	172.0	48.2	75.4	88.8	49.1
				Av.	.....	.....	.....	75.2	89.8	46.5
1949	324.3	210.2	114.1	1953	220.2	172.0	48.2	67.9	81.8	42.2
				*1954	234.8	174.4	60.4	72.4	82.9	52.9
				Av.	.....	.....	.....	69.6	82.3	47.5
1950	349.1	237.5	111.6	1954	234.8	174.4	60.4	67.2	73.4	54.1
				*1955	245.8	183.8	62.0	70.4	77.4	55.5
				Av.	.....	.....	.....	66.8	80.4	54.8
1946–50 total	1573.5	1041.5	532.0	1950–55 total	1121.4	874.4	247.0	71.2	83.9	46.4
1951	374.4	255.5	118.9	1955	245.8	183.8	62.0	65.6	71.9	52.1
				*1956	260.0	191.0	69.0	69.4	74.7	58.0
				Av.	.....	.....	.....	67.5	73.3	55.0
1952	387.3	260.8	126.5	1956	260.0	191.0	69.0	67.1	73.2	54.5
				*1957	267.0	194.5	72.5	68.9	74.6	57.3
				Av.	.....	.....	.....	68.0	73.9	55.9
1953	430.8	281.7	149.1	1957	267.0	194.5	72.5	61.9	69.0	48.6
				*1958	290.0	213.3	76.7	67.3	75.7	51.4
				Av.	.....	.....	.....	64.6	72.3	50.0
1954	469.0	299.1	169.9	1958	290.0	213.3	76.7	61.8	71.3	45.1
				*1959	340.0	240.0	100.0	72.5	80.2	58.8
				Av.	.....	.....	.....	67.1	76.6	51.9
1951–54 total	1661.5	1097.1	564.4	1955–59 total	1157.0	838.8	318.2	69.6	76.4	56.3

*Presumably the year of graduation for the majority of students in the entering class.

Source: Data on acceptances and graduations from Appendix Tables IV–A–1–A and IV–A–1–G. Graduation rates computed in percent.

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TABLE IV–A–3.—*Projection estimate of graduating classes in all fields from Soviet higher educational establishments, 1956–65, and actual graduations, 1956–59*

[in thousands]

Acceptances				Graduations				
Year	Total	Regular	Exten.	Year	Total	Sum	Regular	Extension
					A	B	C	D
1951	374.4	255.5	118.9	1956	258.4	257.0 (260.0)	191.6 (191.0)	65.4 (69.0)
1952	387.3	260.8	126.5	1957	267.2	265.2 (267.0)	195.6 (194.5)	69.6 (72.5)
1953	430.8	281.7	149.1	1958	297.2	293.3 (290.0)	211.3 (213.3)	82.0 (76.7)
1954	469.0	299.1	169.9	1959	323.6	317.7 (340.0)	224.3 (240.0)	93.4 (100.0)
1955	461.4	285.6	175.8	1960	318.4	310.9	214.2	96.7
1951–55 (sum)	.....	.....	.....	1956–60 sum	.....	1444.1	1037.0	407.1
1951–55 total	2122.9	1382.7	740.2	1956–60 total	1464.8	1444.1	1037.0	407.1
1956	458.7	263.8	194.9	1961	316.5	304.9	197.8	107.1
1957	438.3	171.0	267.3	1962	302.4	275.2	128.2	147.0
1958	448.0	211.0	237.0	1963	309.1	288.2	158.2	130.0
1959	485.0	217.0	268.0	1964	334.6	310.1	162.7	147.4
[1960]	[500.0]	[220.0]	[280.0]	1965	345.0	319.0	165.0	154.0
1954–60 sum	.....	.....	.....	1959–65 sum	.....	2126.0	1250.4	875.6
1954–60 total	3260.4	1667.5	1592.9	1959–65 total	2249.6	2126.0	1250.4	875.6

( ) Actual graduations as officially reported
[ ] Assumed acceptances for 1960
A—Derived on the basis of assumed graduation rate of 69 percent for total including extension students.
B—Sums of regular and extension students derived separately.
C—Derived on the basis of assumed graduation rate of 75 percent.
D—Derived on the basis of assumed graduation rate of 55 percent.

Source: Data on acceptances from Appendix Table IV–A–1–A and *KS–1956*, pp. 203–04. Data on actual graduations, 1956–59, from Appendix Table IV–A–1–G. The estimates for the 1956–60 period were originally made in January 1957; the 1961–65 estimates were made in April 1959. The check with actual graduations for the period 1956–58 was introduced in the summer of 1959.

TABLE IV–A–4.—*Projection of 1959–65 graduates from Soviet higher educational establishments by branch*

[In thousands and per cent]

Specialty branch	Flow of graduates by period						1952–58 totals			Anticipated growth factor	1959–65 projection		
								Annual average				Annual average	
	1951–55	1951	1952–55	1956	1957	1958	Total	Thousands	Percent		Total	Thousands	Percent
	A	B	C	D	E	F	G	H	I	J	K	L	M
1. Engineering-industrial	259	44	215	71	83	94	463	66	26.7	1.9	880	126	37.6
2. Agricultural	92	(15)	77	26	30	31	164	23	9.5	1.5	246	35	10.4
Subtotal 1–2	.....	.....	.....	.....	.....	.....	627	.....	.....	.....	1,126	.....	.....
3. Socioeconomic	71	(12)	59	19	20	28	126	18	7.2	na	247	35	10.4
4. Educational-cultural	612	(110)	502	124	109	113	848	122	48.8	na	776	111	33.2
5. Health	87	(20)	67	20	24	25	136	19	7.8	na	196	28	8.4
Subtotal 3–5	.....	.....	.....	.....	.....	.....	1,110	.....	.....	.....	1,219	.....	.....
Grand total	1,121	201	920	260	267	290	1,737	248	100.0	1.35	2,345	335	100.0

na—not reported.

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SOURCES AND NOTES TO TABLE IV–A–4

The 1959–65 projection of Soviet higher education graduates was derived on the basis of data for the period 1952–58, anticipated (planned) ratios of increases in the flow of graduates and available enrollments. The data in Columns A through F are from Table IV–A–1–G. The figures for graduations for 1951 (except for the ones for engineering and the total) in column B are estimates, which are subtracted from the figures for 1951–55 in Column A in order to obtain 1952–55 data. To these data the figures in Cols. D, E and F for 1956–58 have been added. The total number of graduates in 1952–58, the average annual number during the 7-year period and their distribution by specialty branch in percent are given in Cols. G, H and I.

The factor of anticipated growth is stated in Col. J on the basis of official statements concerning the new 7-Year Plan. (*Pravda*, Nov. 14, 1958; *Pravda*, Feb. 8, 1959). It has been verified, furthermore, that on the basis of the prevailing enrollment trends these anticipated increases in graduations are feasible and the distribution of graduates by field is consistent with enrollment trends. On the basis of 1952–58 figures and the announced increases for 1959–65 the figures 1K, 2K and 6K were derived. The number of graduates (for 3K, 4K, 5K) was derived on the basis of enrollment distribution in 1958 as follows:

Branch	*1958 Enrollment*	*Percent Distribution*
3. Socioeconomic	232,000	20.3
4. Educational-cultural	750,000	63.7
5. Health	183,000	16.0
Total	1,145,000	100.0

These percentages were applied in order to redistribute the residual of 1,219,000 indicated as sub-total 3–5 on the table. The figures for the 1958 graduating class (Col. F) are the author's original estimates and differ slightly from the figures officially reported now in Table IV–A–1–G.

The average annual number of graduates (Col. L) and distribution (Col. M) were obtained on the basis of data in Col. K.

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TABLE IV–A–5.—*Relative proportion of women among regular full-time students in Soviet higher educational establishments, 1926–37, 1940, 1950, 1955–59*

[Percent of women enrolled in higher educational establishments by field at the end of a given calendar year]

	x	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s
	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	Average, 1927–37	1940	1950	1955	1956	1957	1958	1959
1. Engineering-Industrial..	7.2	13.4	14.3	15.6	15.5	*17.7	19.8	22.4	23.3	25.6	26.6	28.0	20.2	40.3	30.3	35.4	36.0	33.0	32.0	31.0
2. Agricultural..	16.3	17.4	18.4	20.4	25.4	*28.1	30.6	32.1	31.8	30.2	29.3	30.2	26.7	46.1	39.3	39.3	39.0	34.0	31.0	26.0
3. Socioeconomic	16.5	21.1	22.4	19.4	24.8	*29.8	34.9	36.0	39.0	40.1	39.7	41.3	31.7	63.6	57.0	67.0	.....	.....	.....	.....
4. Education...	48.0	48.7	*49.0	*46.7	44.4	*46.9	49.3	50.2	48.4	46.8	47.4	48.2	47.8	66.5	71.9	72.1	70.0	66.0	65.0	63.0
5. Health.....	52.0	52.0	*54.0	*56.0	58.0	*64.7	71.4	75.1	71.2	69.0	68.8	67.5	64.3	74.1	64.9	69.2	69.0	65.0	62.0	59.0
6. All fields.....	30.9	28.5	29.1	29.2	28.3	*30.8	33.3	36.5	38.0	39.5	41.0	43.1	34.3	58.0	53.1	52.3	51.0	49.0	47.0	45.0

*Figures obtained by interpolation.

SOURCES AND NOTES

Table Code — *Sources and Discussion*

1–6, a,d,f,g.—Beilin, *Kadry*, p. 367; also *Sots Stroi–1935*, p. 617; *SC–Eng–1936*, p. 457; *Sots-Stroi-1934*, p. 410.

1–6h.—*SC–Eng–1936*, p. 457; also *Sots Stroi–1936*, p. 576.

1–6k.—*Sots Stroi–1933–38*, p. 124.

1–6a,g,h,i,j,k.—*Kul't Stroi–1940*, p. 113.

1–3, 6b,c.—*Plan Kadrov–1930*, p. 127.

4c.—By averaging 5a and 5d.

5c.—By averaging 6a and 6d.

4, 5b.—By averaging, and by 2 percentage points upward adjustment in order to reflect the general upward trend.

1–6e.—Derived by averaging (d) and (f) for each field. Some justification for this procedure is implied in the statement in *Itogi Pervogo FYP*, p. 175, which reveals that in 1932 the relative proportion of women in the industrial branch "increased up to 18 percent" (thus 1e is 18 percent as against 17.7 derived by interpolation in the table).

1–6x.—*Plan Kadrov–1930*, p. 127.

1–6, m,n,o.—*NKh–1957*, p. 253; *Vestnik statistiki*, 1956, No. 6, p. 96; *KS–1956*, p. 205. The first two sources state the absolute number of women students in the respective years on the basis of which the percentages were recomputed and incorporated in this table. This was done also as a check, for all these sources report also the approximate percent of women students in regular higher educational establishments.

1–6p.—*Dos–1957*, p. 282. The source does not state explicitly that the reported percent of women students refers to regular enrollment only. The data for 1940 and 1950 can be compared with that reported in other sources, which reveal that the percentages stated should refer to women among regular students only.

1–6q.—*SSSR–Tsif–1958*, p. 360.

1–6r.—*NarKhoz–1959*, p. 840.

1–6s.—*NarKhoz–1960*, p. 751.

It must be noted in general that the averaging procedure in (b) and (c) columns does not lead to any appreciable error. However, in 1932, when the enrollment rose tremendously, it is conceivable that the share of women also greatly increased. So far the only justification of the method employed was found in *Itogi Pervogo FYP*, p. 175. The suppression of 1932 statistics in all publications of later years is extremely conspicuous.

Column 1: "Average 1928–38" represents an unweighted average and is derived by averaging yearly percentages of relative share of women for the period in question.

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TABLE IV–A–6.—*Composition by social origin of students in Soviet higher educational establishments, 1927–38*

[In percent at the beginning of a given year]

	(a) 1927	(b) 1928	(c) 1929	(d) 1930	(e) 1931	(f) 1932	(g) 1933	(h) 1934	(i) 1935	(j) 1938	Average, 1927–38	Averaging error	1937–38 adjusted average
1. Industrial:													
Worker	40.0	38.3	46.4	60.0	61.9	.....	64.6	62.2	59.8	43.5	52.9	.....	53.0
Peasant	.....	14.6	12.8	.....	11.3	.....	7.8	7.1	.....	9.6	10.5	.....	10.4
Other	.....	47.1	40.8	.....	26.8	.....	27.2	30.7	.....	53.1	36.7	+0.1	36.6
2. Agricultural:													
Worker	.....	18.2	23.0	.....	33.0	.....	37.1	36.4	37.1	30.5	30.8	.....	30.8
Peasant	.....	44.4	35.0	.....	34.8	.....	34.4	29.3	.....	36.7	35.7	.....	35.7
Other	.....	37.4	42.0	.....	32.2	.....	28.5	34.3	.....	32.8	34.5	+1.0	33.5
3. Socioeconomic													
Worker	.....	34.2	38.0	.....	41.6	.....	46.0	46.5	44.1	39.2	41.4	.....	41.4
Peasant	.....	23.1	.....	.....	22.7	.....	19.2	15.8	.....	24.9	21.1	.....	21.1
Other	.....	43.7	.....	.....	35.7	.....	34.8	37.7	.....	35.9	37.6	+0.1	37.5
4. Education													
Worker	.....	16.3	.....	.....	28.8	.....	29.8	28.1	26.9	23.9	25.6	.....	25.6
Peasant	.....	27.8	.....	.....	24.1	.....	24.9	20.3	.....	30.3	25.5	.....	25.5
Other	.....	55.9	.....	.....	47.1	.....	45.3	51.6	.....	45.8	49.1	+0.2	48.9
5. Health													
Worker	.....	17.0	.....	.....	35.0	.....	40.9	38.5	37.1	33.6	33.7	.....	33.7
Peasant	.....	14.8	.....	.....	19.9	.....	21.3	18.6	.....	17.6	18.4	.....	18.4
Other	.....	66.2	.....	.....	45.1	.....	37.8	42.9	.....	48.8	48.1	+0.2	47.9
6. All fields:													
Worker	24.2	25.4	30.3	35.2	46.4	58.0	50.3	47.9	45.0	33.9	39.7	.....	39.7
Peasant	23.3	23.9	22.4	20.9	19.3	14.1	16.9	14.6	16.2	21.6	19.3	.....	19.3
Other	52.5	50.7	47.3	43.9	34.3	27.9	32.8	37.5	38.8	44.5	41.0	0.0	41.0

Worker: Workers and their children.
Peasant: Peasants and their children.
Other: Intelligentsia, white-collar workers, proprietors and their children.

NOTES AND SOURCES

Place in Table — Sources and Discussion

(1–6) (wpo) b,e,g.—*Sots Stroi—1934*, p. 411.
(1–6) (wpo) b.—*Podgotovka*, p. 19.
(1–6) (wpo) l.—*Kul't Stroi—1940*, p. 114.
(1–6) (w) i.—*Sots Stroi—1936*, p. 576.
6 (wpo) i.—Bartosek, *Vysoké*, p. 24.
1 (wp) l.—*Sots Stroi—1933–38*, p. 126. This source gives the percentage for workers and peasants combined as 53.0 percent, as against the accepted 53.1 percent. Reference is made to heavy industry engineering schools only.
6 (wpo) f.—*Podgotovka*, p. 19.
4 (wp) l.—*Sots Stroi—1933–38*, p. 126, states that for Soviet universities only workers and peasants combined comprised 50.2 percent of the students.
(1–6) (wpo) b, e, g, h.—Beilin, *Kadry*, p. 511.
1 (w) a, d.—*Plan Kadrov—1930*, p. 124.
1 (wpo) c.—*Podgotovka*, p. 19.
2 (wp) c.—*Plan Kadrov—1930*, p. 125.
3 (w) c.—*Plan Kadrov—1930*, p. 126.
6 (wp) a, b, c, d.—*NarKhoz–1932*, p. 535.

1927–1938 average.—1927–38 average is derived from available data for individual years. This procedure of averaging resulted in an error because of incomplete reporting and some lack of precision in official reporting of this type of data. 1927–38 adjusted average was obtained essentially for statistical purposes in carrying out estimates presented elsewhere in this volume so that the distribution would total 100 percent. Adjustment was made to benefit worker and peasant categories. Thus, when each row was averaged separately, the three categories combined totaled to more than 100 percent in the 1927–38 unadjusted average. The averaging error was then subtracted from "other" category to obtain adjusted average for 1927–38.

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TABLE IV–A–7.—*Composition of regular students by nationality in Soviet higher educational establishments, 1927, 1929–35, 1950, 1956–59*

[In percent of total regular (full-time) enrollment in all fields]

Nationality	a U.S.S.R. national composition (1926 census)	b 1927	c 1929	d 1930	e 1933	f 1934	g 1935	h 1929–35 average	i 1950	j 1956	k 1957	l 1958	m 1959
1. Russians	52.9	56.1	56.1	53.2	53.5	56.0	54.4	54.6	60.8	62.1	62.2	61.9	62.3
2. Ukrainians	21.2	14.6	14.6	17.8	16.1	15.5	14.3	15.7	12.7	13.9	13.8	13.8	13.3
3. Belorussians	3.2	2.9	2.9	2.6	3.3	2.7	3.0	2.9	2.0	2.7	2.7	2.7	2.5
4. Kazakhs	2.7	0.2	0.2	0.3	0.5	0.3	0.4	0.3	1.2	1.2	2.0	2.2	2.4
5. Uzbeks	2.7	0.3	0.3	0.4	0.7	0.9	0.5	0.6	1.5	1.9	1.3	1.5	1.6
6. Georgians	1.2	2.4	2.4	4.3	2.9	2.7	3.5	3.2	2.6	1.8	1.7	1.7	1.7
7. Azerbaidzhans (Turks)	1.2	1.1	1.1	1.4	1.4	1.5	1.3	1.3	1.6	1.4	1.3	1.4	1.3
8. Armenians	1.1	2.0	2.0	2.4	2.3	2.0	2.3	2.2	2.2	1.7	1.1	1.2	1.2
9. Moldavs	.....	0.1	.....	.....	.....	.....	.....	.....	0.2	0.4	0.4	0.4	0.5
10. Latvians	(n)	(n)	.....	.....	.....	.....	.....	.....	0.9	0.7	0.7	0.7	0.7
11. Lithuanians	(n)	(n)	.....	.....	.....	.....	.....	.....	1.0	1.1	0.4	0.4	0.5
12. Tadzhiks	0.7	0.06	0.05	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.5	0.5	0.5
13. Kirgiz	0.5	0.06	.....	.....	.....	.....	0.1	.....	0.4	0.4	1.7	1.6	1.5
14. Turkomen	0.5	0.06	0.05	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.4	0.4	0.4
15. Estonians	(n)	(n)	.....	.....	.....	.....	.....	.....	0.8	0.6	0.6	0.6	0.6
Accounted total	87.9	79.9	79.7	82.6	80.9	81.8	80.0	81.0	88.5	90.7	90.9	91.0	91.0
Other nationalities, total	12.1	20.1	20.3	17.4	19.1	18.2	20.0	19.0	11.5	9.3	9.1	9.0	9.0
of which:													
Jews	1.8	.....	13.5	11.3	12.8	12.2	13.3	12.4	.....	.....	.....	.....	.....
Tatars	2.0	.....	0.8	0.9	1.3	1.4	1.3	1.3	.....	.....	.....	.....	.....
Germans	0.8	.....	0.5	0.6	0.7	0.5	0.7	0.6	.....	.....	.....	.....	.....
Chuvashes	0.8	.....	0.5	0.4	9.4	0.5	0.5	0.4	.....	.....	.....	.....	.....
Bashkirs	0.5	.....	0.1	0.1	0.2	0.2	0.2	0.2	.....	.....	.....	.....	.....
Poles	0.5	.....	0.6	0.8	0.8	0.8	0.7	0.8	.....	.....	.....	.....	.....
Mordvins	0.9	.....	0.2	0.2	0.2	0.3	0.3	0.2	.....	.....	.....	.....	.....
All others	4.8	.....	4.1	3.1	2.7	2.3	3.0	3.1	.....	.....	.....	.....	.....
Regular enrollment (thous.)	.....	168	204	288	458	527	563	.....	845	1,278	1,320	1,333	1,342

SOURCES AND NOTES

Column in Table — Sources and Discussion

c,e,g.—Sots Stroi–1936, p. 576 (data as of Jan. 1)

a,c,d,f.—Sots Stroi–1934, p. 411. Column *a* also in Lorimer, *The Population of the Soviet Union*, pp. 55–61.

c,e,f.—Sots Stroi–1935, p. 617. This source actually reveals that (*e*) is as of Jan. 1, 1933, while (*f*) is of Nov. 1, 1933. Thus (*f*) actually represents year-entry 1934 figure. Same data presented in *SC–Eng–1936*, p. 457.

h.—Unweighted average for the 1929–35 period.

b,i,j.—Dos–1957, p. 283. Percentage distribution was computed by the author on the basis of the absolute figures reported in this source. The definition of nationality contains the wording "*po korennym natsional'nostiam soiuznykh respublik*" (by *root* nationality of the union republics). The numbers 1–15 in the table indeed refer to the nationalities of each of the fifteen union republics which comprised the U.S.S.R., as of 1957.

k,l—SSSR-Tsif–1958, p. 361; *NarKhoz–1959*, p. 841. See Supplement to Table IV–A–7.

m.—NarKhoz–1960, p. 752.

Definition of nationality in Table IV–A–7, col. a, c–h, refers to the concept of root nationality. This concept was reported abolished in the mid-1930's. From that time until 1957 Soviet sources refrained from publishing statistics of this type and statistics on the geographic distribution of enrollment displaced them. Geographic distribution, however, does not reveal which nationality the students actually are, since national minorities might attend institutions located in other localities outside the territorial boundaries of a given union republic. Also some Russians or other nationalities might attend institutions located in the territory of other national republics.

It is known from statistical reporting forms, however, that the nationality of students continued to be reported to central statistical organs. The concept of "root nationality" may have changed and the "declared (in student identification papers—passport) nationality was being used instead. To the great surprise of Western observers, in 1957 Soviet authorities decided to release tabulations of regular student enrollment by nationality, but they referred only to the nationalities which were called the "root nationalities of the union republics." An extensive check with a number of statistical handbooks for localities, regions and republics revealed that the figures thus reported definitely refer to national, rather than geographic criteria. Apparently the unaccounted residual refers, therefore, to all *other* nationalities of the Soviet Union (besides those for which the fifteen union republics are named).

n—None or negligible (not part of U.S.S.R. in pre-World War II boundaries.)

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SUPPLEMENT TO TABLE IV–A–7.—*National composition of students enrolled in Soviet higher educational establishments, selected years, 1927–59*

[In thousands and percent]

Nationality	1927		1950		1956		1956, RSFSR[b]		1957		1958		1959	
	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent	Thousands	Percent
Russians	94.5	56.1	514.1	60.8	792.1	62.1	1054.7	83.3	823.2	62.2	824.9	61.9	835.3	62.3
Ukrainians	24.6	14.8	107.2	12.7	176.6	13.9	57.8	4.5	182.1	13.8	183.6	13.8	179.6	13.3
Belorussians	4.9	2.9	17.2	2.0	34.5	2.7	12.2	1.0	35.1	2.7	35.4	2.7	33.8	2.5
Uzbeks	0.5	0.3	12.5	1.5	24.7	1.9	1.3	0.1	26.3	2.0	28.9	2.2	30.5	2.4
Kazakhs	0.3	0.2	9.9	1.2	16.0	1.2	2.2	0.2	17.5	1.3	19.7	1.5	22.0	1.6
Georgians	4.0	2.4	21.8	2.6	22.9	1.8	2.9	0.2	22.2	1.7	23.1	1.7	23.7	1.7
Azerbaidzhans	1.9	1.1	13.4	1.6	17.4	1.4	1.1	0.1	16.6	1.3	18.3	1.4	17.7	1.3
Lithuanians	.....	.....	8.6	1.0	14.2	1.1	2.0	0.2	15.1	1.1	15.5	1.2	15.8	1.2
Moldavs	0.2	0.1	1.6	0.2	5.5	0.4	0.8	0.1	5.9	0.4	6.0	0.4	6.6	0.5
Latvians	.....	.....	8.1	0.9	9.1	0.7	2.6	0.2	9.4	0.7	9.6	0.7	9.8	0.7
Kirgiz	0.1	0.06	3.1	0.4	5.2	0.4	0.7	0.06	5.4	0.4	5.8	0.4	6.5	0.5
Tadzhiks	0.1	0.06	2.3	0.3	5.8	0.4	0.4	0.03	6.4	0.5	6.7	0.5	6.8	0.5
Armenians	3.4	2.0	18.7	2.2	22.1	1.7	7.3	0.6	22.0	1.7	21.2	1.6	20.4	1.5
Turkomen	0.1	0.06	2.3	0.3	5.3	0.4	0.3	0.01	5.4	0.4	5.7	0.4	5.7	0.4
Estonians	.....	.....	7.0	0.8	7.7	0.6	1.4	0.1	7.5	0.6	7.4	0.6	7.5	0.6
Subtotal	134.6	79.9	747.8	88.5	1159.1	90.7	1147.7	90.7	1200.1	90.9	1211.8	91.0	1221.7	91.0
Other nationalities	33.9	20.1	97.3	11.5	118.8	9.3	119.0[a]	9.3[a]	120.2	9.1	121.2	9.0	119.9	9.0
Official total of regular (day and evening) students	168.5	100.0	845.1	100.0	1279.9	100.0	na	na	1320.3	100.0	1333.0	100.0	1341.6	100.0
Total enrollment	168.5	.....	1247.4	.....	2001.0	.....	1266.7	100.0	2099.1	.....	2178.9	.....	2267.0	.....

Sources and Notes: *Dos–1957*, p. 283; *NarKhoz–1959*, p. 841; *KS–RSFSR–1958*, p. 381: *NarKhoz–1960*, p. 752.

[a] "Other" Total 1956:	*Thousand* 119.0	*Percent* 9.3
Jews	51.6	4.1
Karello-Finns	1.2	0.1
Tatars	22.4	1.8
Bashkirs	4.2	0.3
Dagestan nationalities	4.4	0.3
Buriats	3.0	0.2
Kabardins	1.6	0.1
Komi	2.1	0.2
Mari	1.6	0.1
Mordvins	3.0	0.2
Ossets	3.5	0.2
Udmurs	2.8	0.3
Chuvash	6.2	0.5
Yakuts	2.1	0.2
All other (unspecified)	9.3	0.7

[b] Note that distribution of students in RSFSR is for *total* enrollment, while for the U.S.S.R. (all years) it is for regular students only.

APPENDIX IV–B–1.—*Specialties* (Spetsial'nosti) *Offered in Soviet Higher Educational Establishments as of 1959*

Introductory Note

In order to curtail fragmentary specialization and to introduce some orderly procedure for offering the existing and for introducing new specialties, the Ministry of Higher Education in the fall of 1954 decreed the establishment of definitions and descriptions of specialties. This appendix presents a listing of these specialties. They are arranged by branch and specialty groups. It was decreed in 1954 that thereafter new specialties could be offered by individual higher education institutions only after the approval of the Ministry of Higher Education. The number of specializations (*spetsializatsiia*) within specialties (*spetsial'nosti*) was reduced, but their definitions were not spelled out by the decree. Apparently, as in the past, specializations are decided upon by individual higher education institutes upon the requests of employers of professional graduates.

The listing of the specialties below was compiled first from *VyShkoSPR–1957*, pp. 55–60, and then verified from other sources (particularly *Sprav VUZ–1958* and *Sprav VUZ–1959*). The original listing of specialties was established in accordance with the decree of the Minister of Higher Education of the U.S.S.R. as of September 9, 1954. Subsequent amendments were made as of February 15, April 18, May 13 and 31, August 15, 1955; and

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April 23 and August 13, 1956. Consequently the listing represents specialties (*spetsial'nosti*) as of the start of the academic year 1956–57. Decimal code numbers and specialties in parentheses are those already changed, abolished, or amended. A check of the specialties (in *Sprav VUZ–1958* and *Sprav VUZ–1959*) revealed several specialties not given in *VyShkoSPR–1957*. They have been added in the listing with the two last decimal digits of the classification code as unknowns (a combination of the letters *P,Q and X, Y, Z* was used in the two last places), or else the small letters *a,b* were added after the known specialty. Thus the compilation below presents a listing of the known specialties in Soviet higher educational establishments as of January 1959.

In *VyShkoSPR–1957* a comprehensive decimal classification code was also introduced for the first time in order to designate specialties. It is to be noted that this new decimal classification code began to appear frequently in the title heading of the curricular study plan (*uchebnyi plan*) and other documents dealing with programs of instruction, and thus became an important and widely used identifying symbol. This decimal code is given to the left in the list of specialties following.

Soviet training specialties are, in a sense, occupational specialties (professional titles). Every Soviet study program specifies the *occupational title* which is given to graduates upon the completion of training in that specialty (wherever possible, this occupational title is given after the initials OT in the listings below).

For the engineering and agricultural specialties listed below, detailed comparisons were made also with a Soviet source which became aavilable in the United States for the first time in January 1959. This source is referred to below as *Source Z*, and is: Ministerstvo Vysshego Obrazovaniia SSSR: Metodicheskoe Upravlenie (Ministry of Higher Education of the U.S.S.R.: Administration on Methodology), *Uchebnye plany po spetsial'nostiam vysshikh tekhnicheskikh i sel'skokhoziaistvennykh uchebnykh zavedenii* (Programs of Study for Specialties Offered in Engineering and Agricultural Higher Educational Establishments), Moscow, 1956 (original and microfilm). This book was published by the Soviet publishing house, *Sovetskaia Nauka*, in 5,000 copies, but was not offered for sale (free distribution was made to institutional subscribers). The volume was given directly to the U.S. Exchange Mission on Engineering Education by the U.S.S.R.'s Ministry of Higher Education in November 1958. It contains study plans as of the fall 1955. It is known that in some instances these study plans were changed in 1956–1958. The current reform (1959–63) will bring about further changes in study plans. Interestingly enough, however, the *designation of specialties* has remained basically unaltered as of the academic year 1959–60. Specialties in specialty groups 0100 through 1600, all verified on the basis of the study plans from *Source Z*, were all encountered in *Sprav VUZ–1959*.

In September 1960 the Soviet compilation of new study plans was obtained through private channels. These new study plans were approved by the Ministry of Higher and Secondary Specialized Education on various dates between April and December 1959 and were to go into effect in the academic year 1959–60 or 1960–61. They are contained in the volume: Ministerstvo Vysshego i Srednego Spetsial'nogo Obrazovaniia SSSR (Ministry of Higher and Secondary Specialized Education of the U.S.S.R.), *Uchebnye plany po universitetskim, ekonomicheskim i iuridicheskim spetsial'nostiam (dnevnoe obuchenie)* (Programs of Study for University, Economic and Jurisprudence Specialties (Day Programs), Moscow, 1959, for internal distribution. Most of the programs bear the imprint of approval of Deputy Minister M. A. Prokofiev, who is in charge of a division of the Ministry. The compilation contains 71 folios of study plans, each printed individually in numbers ranging from 300 to 1,000 copies and subsequently bound in one volume. This volume is referred to as *Source Y* in the listing of specialties below.

It is also important to note that the processing of *Source Z* and *Source Y* allowed us to ascertain the number of engineering specialties, specializations, as well as whether the study plan is used in many institutions or by an individual school (see discussion in text). This applicability of study plans is noted in the listing below by the words "Gen" (General, i.e., many institutes and faculties) or "Ind" (Individual, i.e., one specific school).

In 1957 pedagogical education in Soviet higher educational establishments was substantially reformed. The majority of teacher institutes were closed, and the training of teachers in pedagogical intsitutes was re-arranged along the lines of combination of specialties. These changes were verified on the basis of the new study programs. For further details, see *General Note to 21XX–21ZZ*, in the listing below.

Finally, it should be mentioned that an attempt was made to match Soviet specialties with the occupational specialties used in American practice as given, for instance, in the manual: American Society of Mechanical Engineers, *Definitions of Occupational Specialties in Engineering*, New York, 1951. This attempt to match the Russian listings (and fragmentary descriptive information concerning the functional task expected of Soviet graduates) with the American counterparts turned out to be too complicated, however, and was abandoned as not being an efficient means of identifying and comparing the occupational specialties in the two countries. In connection with this effort, however, it was observed that Soviet occupational titles in engineering fields, despite the numerous specializations (about 200) within them, are few in number (about 30) and, at least in

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principle, can be fitted within American specialty fields (about 20). It is to be noted furthermore that U.S. groupings and classifications of engineering specialties in a number of instances are inconsistent or ambiguous, and their further matching with Soviet specialty titles would be hazardous.

In the listing which follows, the following abbreviations and designations are used:

OT—Occupational title awarded at graduation

Gen—General, refers to curriculum offered at several higher educational establishments throughout the country.

Ind—Individual, refers to a curriculum adjusted to a specific school or select schools which follow it.

Offerings—A listing of the higher educational establishments in which the respective specialty program is offered. The name of the higher educational establishment is given in roman-arabic numeral code, corresponding to the designations of higher educational establishments in Appendix II–B–3. See this appendix for the full name of the higher educational establishment under the given code, where all the specialty programs offered by it are presented.

LISTING OF SPECIALTIES BY BRANCH, SPECIALTY GROUP AND SPECIALTY, WITH THE SOVIET DECIMAL CODE FOR EACH SPECIALTY

BRANCH I.—ENGINEERING AND OTHER INDUSTRIAL FIELD SPECIALTIES
(Total in branch: 181)

SPECIALTY GROUP 1.—*Geology and Exploration of Mineral Deposits (Geologiia i razvedka mestorozhdenii poleznykh iskopaemykh)*
(Total in specialty group: 8.)

0101—Geology and exploration of mineral deposits (*Geologiia i razvedka mestorozhdenii poleznykh iskopaemykh*)
Specializations: (1) geology and explorations of solid and gaseous fuel deposits; (2) geology and explorations of ores and non-ore mineral deposits.
OT: Mining engineer-geologist.
Gen: Geological, mining and metallurgical institutes. *Source Y* indicates also a 5½-year program for universities.
Offerings: Regular—I–5; I–10; I–20; I–22; I–24; I–26; I–39; II–5; II–6; II–7; II–16; II–19; II–22; II–25; V–2; V–5; V–6; V–7; V–12; V–19; V–21; V–26. Extension—II–1; II–2.

0102—Geological surveying and prospecting for mineral deposits (*Geologicheskaia s'emka i poiski mestorozhdenii poleznykh iskopaemykh*).
NOTE.—Although *VyShkoSPR–1957* specifies that this specialty is offered in universities only, *Source Z* does not. A processing of *Sprav VUZ–1959* confirms *VyshkoSPR–1957*.
OT: Mining engineer-geologist.
Ind: Moscow Geological Institute and Leningrad Mining Institute. *Source Y* indicates also a 5½-year program for universities.
Offerings: Regular—I–1; I–4; I–11; I–13; I–15; I–19; I–20; I–22; I–27; I–28; I–29; I–31; I–32; V–7; V–12; V–21.

0103—Geology and exploration of oil and gas deposits (*Geologiia i razvedka neftiankh i gazovykh mestorozhdenii*).
OT: Mining engineer-geologist.
Gen: Petroleum and geological institutes. *Source Y* indicates also a 5½-year program for universities.
Offerings: Regular—I–11; I–13; I–20; I–22; II–2; II–22; V–1; V–9. Extension—II–1.

0104—Exploration and preparation for exploitation of peat deposits (*Razvedka i podgotovka torfianykh mestorozhdenii k razrabotke*).
OT: Engineer-hydrologist.
Ind: Moscow Peat Engineering Institute.
Offerings: Regular—V–2A.

0105—Geophysical methods of prospecting for and exploration of mineral deposits (*Geofizicheskie metody poiskov i razvedki mestorozhdenii poleznykh iskopaemykh*).
Specializations: (1) structural (petroleum) geophysics; (2)geophysical methods of surveying oil wells.
OT: Mining engineer-geophysicist.
Gen: Specialization (1) is given in geological and mining institutes; specialization (2) in petroleum engineering institutes. *Source Y* indicates also a 5½-year progarm for universities.
Offerings: Regular—I–13; I–19; I–22; I–27; II–2; II–19; II–22; V–1; V–2; V–6; V–7; V–9; V–12; V–19; V–21. Extension—II–1.

0106—Geochemistry (*Geokhimiia*).
OT: Geologist-geochemist.
Gen: At universities only. *Source Y* indicates a 5½-year program.
Offerings: Regular—I–19; I–20; I–22; I–32.

0107—Hydrogeology and engineering geology (*Gidrogeolgiia i inzhenernaia geologiia*).
OT: Mining engineer-geologist.
Gen: Geological, mining and metallurgical institutes. *Source Y* indicates also a 5½-year program for universities.
Offerings: Regular—I–15; I–19; I–22; I–24; I–28; II–2; II–16; II–19; II–22; V–2; V–6; V–7; V–21. Extension—II–1.

0108—Techniques of exploring mineral deposits (*Tekhnika razvedki mestorozhdenii poleznykh iskopaemykh*).
OT: Mining engineer.
Gen: Geological, mining and metallurgical institutes.
Offerings: Regular—II–19; II–22; V–2; V–6; V–7; V–12; V–19; V–21. Extension—II–1.

SPECIALTY GROUP 2.—*Exploitation of Mineral Deposits (Razrabotka mestorozhdenii poleznykh iskopaemykh)*.
(Total in specialty group: 6.)

0201—Mine surveying (Markscheider service) (*Marksheiderskoe delo*).
OT: Engineer—mine surveyor.
Gen: Mining institutes.
Offerings: Regular—II–7; II–16; II–22; V-2; V–3; V–5; V–6; V–8; V–12; V–19; V–21. Extension—II–1. Evening—II–16b.

0202—Exploitation of mineral deposits (*Razrabotka mestorozhdenii poleznykh iskopaemykh*).
Specializations: (1) underground exploitations of layer deposits; (2) underground exploitations of ore deposits; (3) open peat mining of coal or nonmetallic deposits; (4) exploitation of placer deposits.
OT: Mining engineer.
Gen: Mining institutes.
Offerings: Regular—I–39; II–5; II–6; II–7; II–10; II–16; II–19; II–21; II–22; II–25; V–2; V–3; V–4; V–5; V–6; V–8; V–11; V–12; V–13; V–15; V–16; V–19; V–21; V–21A: V–22; V–26; V–27. Extension—II–1; II–2. Evening—II–7b; V–5a; V–13a; V–15a; II–16a; II–19b.

0203—Exploitation of peat deposits (*Razrabotka torfianykh mestorozhdenii*).
OT: Mechanical engineer.
Gen: Peat engineering institutes.
Offerings: Regular—II–3; II–9; V–2A; XII–93.

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0204—Enrichment and concentration of minerals (*Obogashchenie poleznykh iskopaemykh*).
OT: Mining engineer technologist.
Gen: Mining and metallurgical institutes.
Offerings: Regular—II–22; V–2; V–5; V–6; V–8; V–12; V–15; V–19; V–21A; V–22; V–26. Extension—II–1. Evening—V–24a.

0205—Exploitation of oil and gas deposits (*Razrabotka neftianykh i gazovykh mestorozhdenii*).
Specializations: (1) drilling of wells; (2) exploitation of oil and gas deposits.
OT: Mining engineer.
Gen: Petroleum institutes.
Offerings: Regular—II–2; II–13; II–15; V–1; V–9; V–14. Extension—II–1. Evening—V–14a.

0206—Construction of mining enterprises (*Stroitel'stvo gornykh predpriiatii*).
OT: Mining engineer—mine construction engineer.
Gen: Mining institutes.
Offerings: Regular—II–7; II–16; V–2; V–3; V–4; V–5; V–6; V–8; V–11; V–12; V–13; V–15. Extension—II–1. Evening—II–16a; II–16b.

SPECIALTY GROUP 3.—*Power Engineering (Energetika).*
(Total in specialty group: 10.)

0301—Electric power stations, networks, and systems (*Elektricheskie stantsii, seti i sistemy*).
Specializations: (1) thermal and hydroelectric power stations; (2) electric networks and systems; (3) automatics and relay protective devices for electric power systems.
OT: Electrical engineer.
Gen: Polytechnical, power and electrical engineering institutes.
Offerings: Regular—II–1; II–3; II–5; II–6; II–8; II–9; II–10; II–13; II–14; II–15; II–16; II–18A; II–19; II–20; II–21; II–22; II–23; II–25; II–26; II–27; III–1; III–3; III–5. Extension—II–1; II–2; III–1. Evening—II–13a; II–13b.

0302—High voltage engineering (*Tekhnika vysokikh napriazhenii*).
OT: Electrical engineer.
Ind: Moscow Institute of Power Engineering only; 5½-year program of study.
Offerings: Regular—II–14; II–22; III–3.

0303—Electrification of industrial enterprises and installations (*Elektrifikatsiia promyshlennykh predpriiatii i ustanovok*).
OT: Electro-mechanical engineer.
Gen: Polytechnical, power and electrical engineering institutes.
Offerings: Regular—I–21; II–3; II–3A; II–4; II–5; II–6; II–7; II–8; II–9; II–10; II–12; II–13; II–14; II–15; II–16; II–17; II–18A; II–19; II–20; II–21; II–22; II–23; II–24; II–25; II–26; II–27; III–1; III–2; III–3; III–5; V–5; V–16; XI–15. Extension—II–1; II–2; III–1. Evening—II–4b; II–9a; II–13a; II–13b; II–19a; II–23a; II–23b; II–27b.

0304—Mining electromechanics (*Gornaia elektromekhanika*).
OT: Electromechanical engineer—mining engineer.
Gen: Mining institutes.
Offerings: Regular—II–5; II–6; II–7; II–10; II–16; II–19; II–22; V–2; V–3; V–4; V–5; V–6; V–8; V–11; V–12; V–13; V–15; V–16; V–19; V–21A; V–22; V–26; V–27. Extension—II–1. Evening—II–7b; II–16a; II–19b; V–13a; V–15a.

0305—Thermal power installations of electric power stations (*Teploenergeticheskie ustanovki elektrostantsii*).
Specializations: (1) Boiler installations; (2) turbine installations.
OT: Power engineer.
Gen: Polytechnical and power institutes.
Offerings: Regular—II–5; II–6; II–10; II–13; II–15; II–16; II–17; II–19; II–21; II–22; II–23; II–27; III–1; III–3; XI–4; XI–7. Extension—II–1; II–2; III–1; XI–1.

0306—Technology of water and fuel of electric power stations and industrial installations (*Tekhnologiia vody i topliva elektricheskikh stantsii i promyshlennykh ustanozok*).
OT: Power engineer.
Ind: Moscow Institute of Power Engineering only; 5½-year program of study.
Offerings: Regular—III–1; III–3.

0307—Hydropower installations (*Gidroenergeticheskie ustanovki*).
OT: Civil engineer (construction engineer of hydroelectric power installations).
Ind: Leningrad Polytechnical Institute; 5½-year program of study.
Offerings: Regular—II–14; III–3. Extension—III–1.

0308—Industrial thermal power engineering (*Promyshlennaia teploenergetika*) (heat transfer engineering).
Specializations: (1) oven and gas heat thermal engineering; (2) thermal power equipment and heat supply of industrial enterprises; (3) heat transfer installations.
OT: Industrial power engineer.
Gen: Polytechnical and power institutes.
Offerings: Regular—II–5; II–9; II–10; II–13; II–17; II–18A; II–22; II–23; III–1; III–3; VI–5; VI–9; VII–1; VIII–3; IX–24; XII–98. Extension—II–1; II–2; III–1; VIII–1.

0309—Physics of thermal processes (*Teplofizika*).
OT: Engineer-thermophysicist.
Ind: Moscow Institute of Power Engineering.
Offerings: Regular—II–14; III–13.

03XX—Technology of electrical measurements (*Elektroizmeritel 'naia tekhnika*).
NOTE.—Reference found only in *Sprav VUZ–1959.*
OT: Unknown.
Gen or *Ind:* Unknown.
Offerings: Regular—II–14; III–5; III–7.

SPECIALTY GROUP 4.—*Metallurgy (Metallurgiia)*
(Total in specialty group: 8)

0401—Metallurgy of ferrous metals (*Metallurgiia chernykh metallov*).
Specializations: (1) metallurgy of cast iron; (2) metallurgy of steel; (3) electrometallurgy of steel and ferro alloys.
OT: Metallurgical engineer.
Gen: Metallurgical institutes.
Offerings: Regular—II–5; II–7; II–10; II–14; II–23; II–27; V–3; V–16; V–17; V–18; V–20; V–22; V–23; V–24; V–27. Extension—II–1; II–2. Evening—II–7b; II–23a; II–27b; IV–17a; V–3a; V–24a; V–24b.

0402—Metallurgy of nonferrous metals (*Metallurgiia tsvetnykh metallov*).
OT: Metallurgical engineer.
Gen: Metallurgical institutes.
Offerings: Regular—II–14; II–23; V–6; V–19; V–21; V–21A; V–26. Extension—II–1.

0403—Metallurgical furnaces (*Metallurgicheskie pechi*).
OT: Metallurgical engineer.
Gen: Metallurgical institutes.
Offerings: Regular—II–14; II–23; V–17; V–23; V–24; V–27. Extension—II–1.

0404—Casting of ferrous and nonferrous metals (*Liteinoe proizvodstvo chernykh i tsvetnykh metallov*)
Specializations: (1) casting of ferrous metals and ferro alloys; (2) casting of nonferrous metals and alloys.
OT: Metallurgical engineer.
Gen: Metallurgical institutes.
Offerings: Regular—II–4; II–5; II–10; II–14; II–23; II–27; IV–23; V–17; V–21A; V–23; V–24; V–27. Extension—II–1; II–2. Evening—II–4a; II–4b; II–7a; V–24a.

0405—Physical-chemical analysis and research techniques in metallurgical processes (*Fiziko-khimicheskie issledovaniia metallurgicheskikh protsessov*).
Specializations: (1) metallurgy of ferrous metals; (2) metallurgy of rare metals and production of alloys; (3) powder metallurgy; (4) corrosion and protection of metals.
OT: Metallurgical engineer.
Ind: Moscow Steel Institute only; 5½-year program of study.
Offerings: Regular—II–27; V–17; V–24.

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0406—Physics of metals (*Fizika metallov*).
OT: Metallurgical engineer.
Ind: Moscow Steel Institute only; 5½-year program of study.
Offerings: Regular—II–10; II–14; II–23; V–24; V–27.

0407—Metallography, equipment and technology of thermal processing of metals (*Metallovedenie, oborudovanie i tekhnologiia termicheskoi obrabotki metallov*).
Specializations: (1) metallography, equipment and technology of thermal processing of metals; (2) corrosion and protection of metals; (3) powder metallurgy.
OT: Metallurgical engineer.
Gen: Metallurgical institutes.
Offerings: Regular—I–24; II–4; II–7; II–10; II–14; II–22; II–23; II–26; IV–9; IV–12; IV–23; V–17; V–20; V–22; V–23; V–24; V–27. Extension—II–1; II–2. Evening—V–22a; V–24a.

0408—Processing of metals under pressure (stamping, forming, etc.) (*Obrabotka metallov davleniem*).
Specializations: (1) Rolling and sheathing of ferrous and nonferrous metals; (2) forging-stamping.
OT: Metallurgical engineers.
Gen: Metallurgical institutes.
Offerings: Regular—II–4; II–5; II–7; II–14; II–23; IV–21; IV–23; V–3; V–16; V–17; V–18; V–20; V–21A; V–22; V–23; V–24; V–27. Extension—II–1; II–2. Evening—II–7a; II–23a; II–27b; V–3a; V–22a; V–24a.

Specialty Group 5.—*Machine Building and Instrument Construction (Mashinostroenie i priborostroenie).*
(Total in specialty group: 38.)

0501—Technology of machine building, metal-cutting tools and instruments (*Tekhnologiia mashinostroeniia, metallorezhushchie stanki i instrumenty*).
OT: Mechanical engineer.
Gen: Machine building, industrial and polytechnical institutes.
Offerings: Regular—II–1; II–3; II–3A; II–4; II–5; II–6; II–8; II–9; II–10; II–11; II–12; II–13; II–14; II–15; II–16; II–17; II–18; II–18A; II–19; II–21; II–22; II–23; II–24; II–25; II–26; II–27; III–5; IV–1; IV–2; IV–4; IV–5; IV–8; IV–9; IV–11; IV–12; IV–13; IV–14; IV–15; IV–16; IV–17; IV–19; IV–25; V–2A; V–19; IX–24. Extension—II–1; II–2; IV–1. Evening—II–3a; II–3b; II–4a; II–4b; II–4d; II–7a; II–9a; II–13a; II–13b; II–13c; II–16b; II–19a; II–23a; II–23b; II–26a; II–26b; II–27a; II–27b; IV–1a; IV–5a; IV–9a; IV–9b; IV–17a; IV–20a; V–24b; VIII–2a.

0502—Machinery and technology of casting processes (*Mashiny i tekhnologiia liteinogo proizvodstva*).
OT: Mechanical engineer.
Gen: Machine building and polytechnical institutes.
Offerings: Regular—II–1; II–3; II–3A; II–17; II–18; II–19; II–26; IV–1; IV–2; IV–4; IV–8; IV–9; IV–11; IV–12; IV–13; IV–14; IV–15; IV–16. Evening—II–3a; II–26a; II–26b; II–27a; IV–1a; IV–9a; IV–17a; V–24b.

0503—Machinery and technology of processing metals under pressure (*Mashiny i tekhnologiia obrabotki metallov davleniem*).
OT: Mechanical engineer.
Gen: Machine building and polytechnical institutes.
Offerings: Regular—II–3; II–3A; II–4; II–10; II–14; II–26; II–27; IV–4; IV–5; IV–8; IV–11; IV–12; IV–13; IV–14; IV–15. Extension—IV–1. Evening—II–4a; II–7a; II–26b; IV–9b; IV–17a; V–24b.

0504—Equipment and technology of welding processes (*Oborudovanie i tekhnologiia svarochnogo proizvodstva*).
OT: Mechanical engineer.
Gen: Machine building and polytechnical institutes.
Offerings: Regular—II–4; II–10; II–13; II–14; II–15; II–22; II–23; II–27; IV–2; IV–9; IV–12; IV–15; IV–18; IV–19; IV–21; IV–23; V–20. Extension—II–2; IV–1. Evening—II–4b.

0505—Mechanical equipment of ferrous and nonferrous metallurgical plants (*Mekhanicheskoe oborudovanie zavodov chernoi i tsvetnoi metallurgii*).
Specializations: (1) mechanical equipment of metallurgical plants; (2) automation of metallurgical processes.
OT: Mechanical engineer.
Gen: Metallurgical institutes.
Offerings: Regular—II–7; II–23; II–27; V–17; V–18; V–20; V–22; V–27. Evening—II–7b; V–24b.

0506—Mining machinery (*Gornye mashiny*)
OT: Mining-mechanical engineer.
Gen: Mining institutes.
Offerings: Regular—II–7; IV–17; V–2; V–3; V–4; V–6; V–8; V–11; V–15; V–27. Extension—II–1; II–2. Evening—II–16a; V–3a.

0507—Peat mining machinery (*Torfianye mashiny*).
OT: Mechanical engineer.
Gen: Peat engineering institutes.
Offerings: Regular—II–3; V–2A.

0508—Machinery and equipment of oil and gas fields (*Mashiny i oborudovanie neftianykh i gazovykh promyslov*).
Specializations: (1) machinery and equipment for petroleum and gas fields; (2) transportation and storage of petroleum and gas.
OT: Mechanical engineer.
Gen: Petroleum institutes.
Offerings: Regular—II–2; II–13; II–15; V–1; V–9; V–14. Extension—II–1.

0509—Agricultural machinery (*Sel'skokhoziaistvennye mashiny*).
OT: Mechanical engineer.
Gen: Machine building and polytechnical institutes.
Offerings: Regular—II–19; II–26; IV–1; IV–15.

0510—Lifting, hoisting and transportation machinery and equipment (*Pod'emno-transportnye mashiny i oborudovanie*).
OT: Mechanical engineer.
Ind: Moscow—Bauman Higher Technical School; 5½-year program of study.
Offerings: Regular—II–14; II–17; II–23; II–26; IV–12; XI–15; XI–17. Extension—II–1. Evening—II–7a; II–16a.

0511—Construction and road-building machinery and equipment (*Stroitel'nye i dorozhnye mashiny i oborudovanie*).
OT: Mechanical engineer.
Gen: Offered in two types of institutes—(1) construction engineering institutes; and (2) road maintenance institutes.
Offerings: Regular—II–3; II–14; IX–3; IX–8; IX–9; IX–10; IX–17; IX–23; IX–24; IX–25; IX–26; IX–27; XI–3; XI–7; XI–9. Extension—II–1; IX–1; IX–2; XI–1. Evening—II–3b; II–16a.

0512—Railway car building (*Vagonostroenie*).
OT: Mechanical engineer.
Ind: Bezhitsa Institute of Transportation Machine Building.
Offerings: Regular—IV–2; XI–2; XI–3; XI–4; XI–7; XI–8; XI–10; XI–12. Extension—IV–1; XI–1.

0513—Automobiles and tractors (*Avtomobili i traktory*).
Specializations: (1) automobiles; (2) tractors; (3) automotive and tractor engines.
OT: Mechanical engineer.
Gen: Machine building and polytechnical institutes.
Offerings: Regular—II–3; II–4; II–5; II–26; II–27; IV–1; IV–8; IV–16. Extension—II–1; II–2; IV–1. Evening—II–3a; II–4a; II–27a; IV–1a; IV–9b.

0514—Shipbuilding and ship repair (*Sudostroenie i sudoremont*).
OT: Naval engineer.
Gen: Shipbuilding institutes.
Offerings: Regular—II–4; II–6; II–11; II–21; IV–18; IV–19; VII–11A; XI–14; XI–17; XI–20. Extension—II–2. Evening—II–4b.

0515—Printing (polygraphic) machinery (*Poligraficheskie mashiny*).
OT: Mechanical engineer.
Gen: Polygraphic institutes.
Offerings: Regular—IV–27; IV–28. Extension—IV–2.

0516—Machinery and installations of chemical industry (*Mashiny i apparaty khimicheskikh proizvodstv*).

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Specializations: Machinery and installations for: (1) inorganic chemical processes; (2) organic chemical processes; (3) silicates; (4) cellulose and wood pulp processes; (5) liquid and gas fuels; and (6) chemical machine building and equipment construction.
OT: Mechanical engineer.
Gen: Machine building and polytechnical institutes.
Offerings: Regular—I–24; II–2; II–4; II–10; II–13; II–16; II–17; II–19; II–22; II–23; II–26; II–27; V–1; V–4; V–9; VI–1; VI–2; VI–3; VI–4; VI–5; VI–6; VI–9; VI–10; VII–1A; XII–106. Extension—II–1; II–2; IX–1. Evening—VI–4a.

0517—Machinery and installations of food industry (*Mashiny i apparaty pishchevykh proizvodstv*).
Specializations: (1) machines and equipment for food industry; (2) equipment for grain storage and processing.
OT: Mechanical engineer.
Gen: Food technology institutes.
Offerings: Regular—II–5; VI–4; VII–1; VII–1A; VII–2; VII–4; VII–5; VII–6; VII–7; VII–8; VII–9; VII–10; VII–11A. Extension—VII–1.

0518—Machinery and installations of light* and textile industries (*Mashiny i apparaty proizvodstv legkoi i tekstil'noi promyshlennosti*).
Specializations: (1) machinery and equipment for textile industry; (2) machinery and equipment for light* industry.
OT: Mechanical engineer.
Gen: Textile and light industry technological institutes.
Offerings: Regular—II–14; II–21; VIII–1; VIII–2; VIII–3; VIII–4; VIII–5; VIII–6; VIII–7. Extension—VIII–1. Evening—VIII–2a; VIII–6a.

0519—Machinery and equipment for timber industry and forestry (*Mashiny i mekhanizmy lesnoi promyshlennosti i lesnogo khoziaistva*).
Specializations: (1) machinery and equipment for timbering; (2) mechanization of forestry.
OT: Mechanical engineer.
Gen: Forestry institutes.
Offerings: Regular—I–25; VIII–4; XII–98; XII–102; XII–104; XII–105; XII–106; XII–107. Extension—XII–1. Evening—I–25a; XII–104a.

0520—Boiler construction (*Kotlostroenie*).
OT: Mechanical engineer.
Gen: Polytechnical, power and machine building institutes.
Offerings: Regular—II–10; II–14; II–22; II–26; III–3; IV–12; IV–18. Extension—II–2.

0521—Turbine construction (*Turbinostroenie*).
OT: Mechanical engineer.
Gen: Polytechnical, power and machine building institutes.
Offerings: Regular—II–10; II–14; II–26; III–3; IV–2; IV–18. Extension—II–2; IV–1.

(0522)—(Abolished, used to be steam engine construction) NOTE.—*Source Z,* however, mentions an individual 5½-year curriculum at Moscow's Bauman Higher Technical School.

0523—Internal combustion engines (*Dvigateli vnutrennego zgoraniia*).
Specializations: (1) production and design of ship and permanent installation combustion engines; (2) production and design of automotive and tractor engines; (3) production and design of special-purpose combustion engines [perhaps this includes aircraft engines].
OT: Mechanical engineer.
Ind: Moscow's Bauman Higher Technical School; 5½-year program of study.
Offerings: Regular—II–14; II–16; II–22; II–26; II–27; IV–1; IV–8; IV–12; IV–16; IV–18. Extension—IV–1. Evening—IV–9a.

0524—Ship engines and mechanisms (*Sudovye mashiny i mekhanizmy*).
OT: Mechanical engineer.
Gen: Water transportation institutes.
Offerings: Regular—XI–14; XI–15; XI–16; XI–17.

0525—Ship power installations (*Sudovye silovye ustanovki*)
Specializations: (1) steam and piston engine installations; (2) gas turbine installations; (3) combustion engine installations.
OT: Mechanical engineer.
Gen: Shipbuilding institutes; 5½-year curriculum.
Offerings: Regular—II–4; II–6; II–21; IV–18; IV–19; VII–9; VII–11A; XI–18; XI–19; XI–20; XI–21. Extension—II–2. Evening—II–4b.

0526—Locomotive building (*Lokomotivostroenie*) (revised, of all types).
OT: Mechanical engineer.
Ind: Moscow's Bauman Higher Technical School.
Offerings: Regular—II–26; IV–2; IV–12; XI–1; XI–3; XI–4; XI–7; XI–8; XI–10; XI–12; XI–13. Extension—IV–1. Evening—II–26a; IV–9a.

(0527)—(Abolished, used to be diesel locomotive building, while 0526 used to be steam locomotive building; now both combined under 0526.)

0527—Dynamics and strength of machine design (*Dinamika i prochnost' mashin*).
OT: Mechanical engineer.
Ind: Reported in *Source Z* for Leningrad Polytechnical Institute only; 5½-year program of study. However, this specialty is also offered in the Kharkov Polytechnical Institute (*Sprav VUZ–1959*).
Offerings: Regular—II–14; II–26. Extension—XI–1.

0528—Hydraulic turbines and other hydraulic machinery (*Gidravlicheskie turbiny i drugie gidravlicheskie mashiny*).
OT: Mechanical engineer.
Ind: Moscow's Bauman Higher Technical School; 5½-year program of study.
Offerings: Regular—II–14; II–26; III–3; IV–12.

0529—Refrigeration and compressor machinery and installations (*Kholodil 'nye i kompressornye mashiny i ustanovki*).
Specializations: Production and design of (1) refrigerator equipment and installations; (2) deep-freeze machinery and installations; (3) compressors and related installations.
OT: Mechanical engineer.
Ind: Moscow's Bauman Higher Technical School; 5½-year program of study.
Offerings: Regular—II–14; III–3; IV–12; VI–3; VI–4; VI–9; VII–4; VII–8; VII–9; VII–10; VII–11A.

0530—Optical instruments (*Opticheskie pribory*).
OT: Mechanical engineer.
Ind: Moscow's Bauman Higher Technical School; 5½-year program of study.
Offerings: Regular—IV–7; IV–12; IX–20.

0531—Instruments of precision mechanics (*Pribory tochnoi mekhaniki*).
Specializations: (1) measuring instruments and automatic control devices; (2) timer devices.
OT: Mechanical engineer.
Gen: Machine building, polytechnical and industrial institutes.
Offerings: Regular—II–18; II–18A; IV–7; IV–9; IV–11; IV–12; IV–15. Extension—II–2; IV–1. Evening—IV–9b.

0532—Geodesy instruments (*Geodezicheskie pribory*).
OT: Mechanical engineer.
Gen: Institutes of engineering for geodesy, aerial photography and cartography.
Offerings: Not found in *Sprav VUZ–1958* or *1959*.

0533—Cinematographic equipment (*Kinoapparatura*).
OT: Mechanical engineer.
Ind: Leningrad Institute of Cinema Engineering.
Offerings: Regular—IV–29.

05XX—Aircraft construction (body-frame) (*Samoletostroenie*).
OT: Not given in *Source Z.*
Gen: Aviation engineering institutes. Program of study and decimal code for specialty are not known. Specialty listed in *Sprav VUZ–1958* and *1959*.

* Includes: leather, fur processing and manufacturing, and garment industries.

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Offerings: Regular—IV–20; IV–21; IV–23; IV–24; IV–26. Extension—IV–1.

05XY—Aircraft engines (and propulsion devices) (*Aviatsionnye dvigateli*).
OT: Not given in *Source Z.*
Gen: Aviation engineering institutes. Program of study and decimal code for specialty are not known. Specialty listed in *Sprav VUZ–1958* and *1959.*
Offerings: Regular—IV–20; IV–21; IV–23; IV–24; IV–25; IV–26. Extension—IV–1.

05XZ—Aerodynamics and strength of aircrafts (*Aerodinamika i prochnost' samoletov*).
OT: Not given in *Source Z.*
Ind: Leningrad Polytechnic Institute. Program of study and decimal code for specialty are not known. Specialty listed in *Sprav VUZ–1958* and *1959.*
Offerings: Regular—II–14.

05YX—Tool and die engineering (*Instrumental'noe proizvodstvo*).
OT: Not given in *Source Z.*
Ind: Moscow Machine Tool Engineering Institute. Program of study and decimal code for specialty are not known. Specialty listed in *Sprav VUZ–1958* and *1959.* This specialty is listed, however, as a specialization within Specialty 0501. Separate listing is given here because of the uniqueness of such a reference (specializations are usually omitted from listing in *Sprav VUZ–1958 and 1959*).
Offerings: Regular—IV–11.

05YY—Mechanical equipment of flight devices (*Mekhanicheskoe oborudovanie letatel'nykh apparatov*).
OT: Not given in *Source Z.*
Ind: Moscow Aviation Institute. Program of study and decimal code for specialty are not known. Specialty listed in *Sprav VUZ–1959* only. Observe the peculiar wording "flight devices," which is uncommon in reference to aircrafts.
Offerings: Regular—IV–24.

SPECIALTY GROUP 6.—*Electrical Machine Building and Electrical Instrument Construction (Elektromashinostroenie i elektropriborostroenie).*
(Total in specialty group: 21.)

0601—Electrical machinery and equipment (*Elektricheskie mashiny i apparaty*).
Specializations: (1) electrical machinery; (2) electrical equipment.
OT: Electro-mechanical engineer.
Gen: Polytechnical, power and electrical engineering institutes.
Offerings: Regular—II–1; II–8; II–10; II–14; II–15; II–16; II–19; II–22; II–23; II–26; III–3; III–5. Extension—II–1; II–2; III–1. Evening—II–4d.

0602—Electric transport (machinery and equipment, *not* maintenance and operations, which is 1602) *Elektricheskii transport*).
OT: Electro-mechanical engineer.
Ind: Moscow Institute of Power Engineering; 5½-year program of study.
Offerings: Regular—II–14; III–3.

0603—Electric insulation and cable technology (*Elektroizoliatsionnaia i kabel'naia tekhnika*).
OT: Electrical engineer.
Gen: Polytechnical, power and electrical engineering institutes.
Offerings: Regular—II–14; II–22; II–26; III–3. Extension—III–1.

0604—Dielectrics and semi-conductors (*Dielektriki i poluprovodniki*).
OT: Electrical engineer.
Ind: Moscow Institute of Power Engineering; 5½-year program of study.
Offerings: Regular—II–10; II–14; II–22; III–2; III–3.

0605—Electro-vacuum machinery (*Elektrovakuumnye mashiny*).
OT: Mechanical engineer.
Ind: Moscow's Bauman Higher Technical School.
Offerings: Regular—III–5.

0606—Automatic, telemechanic, and electric measuring instruments, devices, and systems (*Avtomaticheskie, telemekhanicheskie i elektroizmeritel'nye pribory i ustroistva*).
Specializations: (1) automatic and telemechanic equipment and devices; (2) electrical measuring devices.
OT: Electrical engineer.
Gen: Polytechnical, power, electrical and radio engineering institutes.
Offerings: Regular—II–2; II–5; II–8; II–10; II–13; II–14; II–15; II–16; II–17; II–18; II–18A; II–21; II–22; II–23; II–26; II–27; III–1; III–2; III–3; III–6; IV–7; IV–12; IV–15; IV–17; VII–9; VIII–2; VIII–6; XI–4; XII–102; XII–104. Extension—II–1; II–2; III–1.

0607—Instruments and devices of guidance and control chemical processes (*Pribory upravleniia i kontrolia khimicheskikh proizvodstv*).
OT: Mechanical engineer.
Ind: Moscow Institute of Chemical Machine Building; 5-year program of study.
Offerings: Regular—II–2; II–4; II–15; II–16; II–17; II–19; II–22; V–9; V–13; VI–1; VI–3; VI–6; VI–9; VI–10; VII–1A; VII–5.

0608—Mathematical and computing instruments, devices and systems (*Matematicheskie i schetno-reshaiushchie pribory i ustroistva*).
Specializations: (1) electric computing devices; (2) guidance devices.
OT: Electrical engineer.
Gen: Polytechnical, power, electrical and radio engineering institutes.
Offerings: Regular—II–4; II–5; II–8; II–10; II–14; II–18; II–22; II–26; III–2; III–3; III–5; III–6; III–7; IV–7; IV–12; IV–20; IV–24; XII–104. Extension—III–1.

0609—Gyroscopic instruments, devices and systems (*Giroskopicheskie pribory i ustroistva*).
OT: Mechanical engineer.
Ind: Moscow's Bauman Higher Technical School; 5½-year program of study.
Offerings: Regular—I–27; III–2; IV–7; IV–12; IV–20; IV–22; IV–24; IX–24.

0610—Electro-acoustics (*Elektroakustika*).
OT: Engineer—electrophysicist.
Ind: Leningrad Electrical Engineering Institute; 5½-year program of study.
Offerings: Regular—III–2.

0611—Electronic instruments (*Elektronnye pribory*)
OT: Electrical engineer.
NOTE.—Two programs of training exist, one for 5 years, the other for 5½ years. The 5½-year program is individual and is offered in Moscow's Institute of Power Engineering. The 5-year program is general and is offered in power, electrical, polytechnical, and radio engineering institutes.
Offerings: Regular—II–10; II–15; II–22; II–26; III–2; III–3; III–5; III–6; III–7; IV–9. Extension—II–1; II–2; III–1.

0612—Industrial electronics (*Promyshlennaia elektronika*).
OT: Electrical engineer.
Ind: Moscow Institute of Power Engineering; 5½-year program of study.
Offerings: Regular—II–10; II–14; II–22; III–2; III–3. Extension—II–1.

0613—Electrothermal installations (*Elektrotermicheskie ustanovki*).
OT: Electromechanical engineer.
Ind: Moscow Institute of Power Engineering; 5½-year program of study.
Offerings: Regular—III–2; III–3.

0614—Lighting engineering and searchlight equipment building (*Svetotekhnika i prozhektorostroenie*).
OT: Electrical engineer.
Ind: Moscow Institute of Power Engineering; 5½-year program of study.
Offerings: Regular—III–3.

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0615—Sound engineering (acoustic engineering) (*Zvukotekhnika*).
Specializations: (1) production and operation of cinema and electroacoustic equipment; (2) acoustic engineering.
OT: Electrical engineer.
Ind: Leningrad Institute of Cinema Engineering.
Offerings: Regular—II–10; IV–29.

06XX—Electric installations on ships (*Elektrooborudovanie sudov*).
OT: Not given in *Source Z.*
Ind: Far Eastern Polytechnical Institute in Vladivostok, Leningrad's Electrical Engineering Institute, Merchant Marine Schools in Leningrad and Odessa. Program of study and decimal code are not known. Specialty listed in *Sprav VUZ–1958* and *1959.*
Offerings: Regular—II–6; III–2; XI–19; XI–21.

06XY—Aircraft equipment and instrumentation (*Aviapriborostroenie*).
OT: Not given in *Source Z.*
Gen: Aviation engineering institutes. Program of study and decimal code are not known. Specialty listed in *Sprav VUZ–1958* and *1959.*
Offerings: Regular—IV–20; IV–22; IV–23; IV–24.

06XZ—Electric installation and equipment of aircrafts (*Aviatsionnoe elektrooborudovanie*).
OT: Not given in *Source Z.*
Gen: Aviation engineering institutes. Program of study and decimal code for specialty are not known. Specialty listed in *Sprav VUZ–1958* and *1959.*
Offerings: Regular—II–22; III–3; IV–22; IV–24.

06YX—Electromechanical equipment and devices (for aircrafts) (*Elektromekhanicheskie ustanovki*)
OT: Not given in *Source Z.*
Ind: Moscow Aeronautical Engineering Institute, department of electromechanical devices, offers a set of specialties which are unknown but listed commonly as that indicated in the title. Listed in *Sprav VUZ–1958* and *1959.*
Offerings: Regular—IV–24.

06YY—Design and operation of atomic energy installations (*Proektirovanie i ekspluatatsiia atomnykh ustanovok*).
OT: Not given in *Source Z.*
Ind: Moscow Power Engineering Institute. Program of study and decimal code are not known. Specialty listed in *Sprav VUZ–1958* and *1959.*
Offerings: Regular—II–22; III–3.

06YZ—Optics and spectroscopy (*Optika i spektroskopiia*).
OT: Not given in *Source Z.*
Ind: Leningrad Electrical Engineering Institute. Program of study and decimal code are not known. Specialty listed in *Sprav VUZ–1958* and *1959.*
Offerings: Regular—III–2.

SPECIALTY GROUP 7.—*Radio Engineering and Communications (Radiotekhnika i sviaz').*
(Total in specialty group: 12.)

0701—Radio engineering (*Radiotekhnika*).
OT: Radio engineer.
Gen: Polytechnical, power, electrical engineering and radio institutes.
Offerings: Regular—II–3; II–4; II–9; II–10; II–15; II–18; II–22; II–23; II–26; III–2; III–3; III–5; III–7; IV–9; IV–22; V–24; XI–19; XI–25. Extension—II–2; III–1. Evening—II–9a.

0702—Telegraph and telephone communications (wire communications) (*Telegrafnaia i telefonnaia sviaz'*) (revised).
OT: Communication engineer.
Gen: Communications institutes.
Offerings: Regular—XI–24; XI–25; XI–26; XI–27; XI–28. Extension—XI–2.

0703—Radio communications and broadcasting (*Radiosviaz' i radioveshchanie*).
OT: Radio engineer.
Gen: Communications institutes.
Offerings: Regular—XI–23; XI–24; XI–25; XI–26; XI–27; XI–28. Extension—XI–2.

0704—Design and manufacturing technology of radio equipment (*Konstruirovanie i tekhnologiia proizvodstva radioapparatury*).
OT: Radio engineer.
Gen: Polytechnical, power, electrical engineering and radio institutes.
Offerings: Regular—II–3A; II–4; II–9; II–10; II–15; II–18; II–22; II–23; II–26; II–27; III–2; III–3; III–5; III–6; III–7; IV–7; IV–12; IV–20; IV–22; IV–24. Extension—II–1; II–2; III–1. Evening—II–9a.

07XX or 0704a—Radiophysics and electronics (*Radiofizika i elektronika*).
OT: Not given in *Source Z.* Radiophysicist (*Source Y*).
Ind: Leningrad Polytechnical Institute and Moscow Institute of Power Engineering. Program of study and decimal code are unknown. Specialty listed in *Sprav VUZ–1958* and *1959. Source Y* states that a general program in the specialty radiophysics and electronics is given in universities with the length of training 5 years, 4 months.
Offerings: Regular—I–3; I–5; I–6; I–11; I–13; I–24; I–27; I–32; III–3.

07XY—Electromechanical communication equipment (*Elektromekhanicheskaia apparatura sviazi*).
OT: Not given in *Source Z.*
Ind: Penza Polytechnical Institute. Program of study and decimal code are not known. Specialty listed in *Sprav VUZ–1958* and *1959.*
Offerings: Regular—II–18.

07XZ—Electronics (*Elektronika*).
OT: Not given in *Source Z.*
Ind or *Gen:* Not known. Program of study and decimal code not known. Specialty listed in *Sprav VUZ–1959.*
Offerings: Regular—I–3; I–15; I–22; I–26; I–27; I–37.

07YX—Radiophysics (*Radiofizika*).
OT: Not given in *Source Z.*
Ind or Gen: Not known. Program of study and decimal code not known. Specialty listed in *Sprav VUZ–1959.*
Offerings: Regular—I–15; I–22; I–31; I–37.

07YY—Equipment and installations of radio engineering machinery and telemetering devices (*Pribory i ustanovki radiotekhnicheskikh mashin i dozimetricheskikh izmerenii*).
OT: Not given in *Source Z.*
Ind or Gen: Not known. Programs of study and decimal code not known. Specialty listed in *Sprav VUZ–1959.*
Offerings: Regular—II–22.

07YZ—Engineering exploitation of aircraft electronic equipment (*Tekhnicheskaia ekspluatatsiia aviatsionnogo radiooborudovaniia*).
OT: Not given in *Source Z.*
Ind or Gen: Not known. Program of study and decimal code not known. Specialty listed in *Sprav VUZ–1959.*
Offerings: Regular—XI–22.

07ZX—Machines and equipment of communications enterprises (*Mashiny i oborudovanie predpriiatii sviazi*).
OT: Not given in *Source Z.*
Ind or Gen: Not known. Program of study and decimal code not known. Specialty listed in *Sprav VUZ–1959.*
Offerings: Regular—XI–25.

07ZY—Engineering exploitation of aircraft instruments and electrical equipment of aircrafts (*Tekhnicheskaia ekspluatatsiia aviatsionnykh priborov i elektrooborudovanie samoletov*).
OT: Not given in *Source Z.*
Ind or Gen: Not known. Program of study and decimal code not known. Specialty listed in *Sprav VUZ–1959.*
Offerings: Regular—XI–22.

SPECIALTY GROUP 8.—*Chemical Technology Engineering (Khimicheskaia tekhnologiia).*
(Total in specialty group: 16.)

0801—Petroleum and natural gas technology (*Tekhnologiia nefti i gaza*).
OT: Technology engineer.

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Gen: Petroleum institutes.
Offerings: Regular—II–2; II–13; II–15; V–1; V–9; V–14; VI–3. Extension—II–1. Evening—II–13d.

0802—Chemical technology of fuels (*Khimicheskaia tekhnologiia topliva*).
Specializations: Technology of (1) synthetic liquid fuels; (2) gases; (3) coking and residual compounds; (4) carbon electrodes.
OT: Technology engineer.
Gen: Chemical technology institutes.
Offerings: Regular—II–7; II–21; II–22; II–23; II–26; V–2A; V–17; V–18; V–22; VI–1; VI–6; VI–7; VI–8. Extension—II–1.

0803—Technology of nonorganic compounds (*Tekhnologiia neorganicheskikh veshchesty*).
OT: Technology engineer.
Gen: Chemical technology institutes.
Offerings: Regular—I–24; II–4; II–5; II–8; II–9; II–10; II–15; II–16; II–19; II–21; II–22; II–23; II–26; VI–1; VI–2; VI–3; VI–4; VI–6; VI–7; XII–106. Extension—II–2. Evening—II–4c; II–19a; VI–4a.

0804—Technology of rare and diffused elements (*Tekhnologiia redikikh i rasseiannykh elementov*).
OT: Technology engineer.
Gen: Chemical technology institutes.
Offerings: Regular—VI–6; VI–7; VI–8.

0805—Technology of electrochemical processes (*Tekhnologiia elektrokhimicheskikh proizvodstv*).
OT: Technology engineer.
Gen: Chemical technology institutes.
Offerings: Regular—II–4; II–5; II–10; II–16; II–23; II–26; VI–1; VI–2; VI–4; VI–6; VI–7. Extension—II–1; II–2. Evening—II–4c.

0806—Technology of silicates (*Tekhnologiia silikatov*).
Specializations: technology of (1) binding and cementitious materials; (2) ceramics and refractories; (3) glass.
OT: Technology engineer.
Gen: Chemical technology institutes.
Offerings: Regular—II–3; II–4; II–5; II–9; II–10; II–15; II–16; II–19; II–21; II–22; II–23; II–26; V–17; VI–1; VI–4; VI–6; VI–7. Extension—II–1; II–2; IX–1.

0807—Technology of basic organic synthesis and synthetic rubber manufacturing (*Tekhnologiia osnovnogo organicheskogo sinteza i sinteticheskogo kauchuka*).
OT: Technology engineer.
Gen: Chemical technology institutes.
Offerings: Regular—II–4; II–8; II–10; II–13; II–15; II–17; II–22; V–4; VI–1; VI–2; VI–3; VI–6; VI–8; VI–10; VII–1A; VIII–7. Extension—II–1; II–2. Evening—11–4c.

0808—Technology of dyes and intermediate products (*Tekhnologiia krasitelei i promezhutochnykh produktov*).
OT: Technology engineer.
Gen: Chemical technology institutes.
Offerings: Regular—II–15; II–23; II–26; VI–2; VI–6; VI–7. Extension—II–1.

0809—Technology of medical drugs and aromatic compounds (*Tekhnologiia lekarstvennykh i dushistykh veshchestv*).
OT: Technology engineer.
Gen: Chemical technology institutes.
Offerings: Regular—II–22; II–23; VI–6. Extension—II–1.

0810—Technology of plastics (*Tekhnologiia plasticheskikh mass*).
OT: Technology engineer.
Gen: Chemical technology institutes.
Offerings: Regular—II–13; II–15; II–22; II–23; IV–23; V–4; VI–1; VI–3; VI–4; VI–6; VI–7; VII–1A; VII–2; VII–6; VII–10; XII–98; XII–107. Extension—II–1.

0811—Technology of varnishes, paints and nonmetallic coatings (*Tekhnologiia lakov, krasok i nemetallicheskikh pokrytii*).
OT: Technology engineer.
Gen: Chemical technology institutes.
Offerings: Regular—II–26; VI–2; VI–6; VI–7; VI–10; Extension—II–1.

0812—Technology of rubber (*Tekhnologiia reziny*).
OT: Technology engineer.
Gen: Chemical technology institutes.
Offerings: Regular—II–22; VI–1; VI–6; VI–8; VI–10; VII–1A. Extension—II–1; II–2.

0813—Technology of cinematographic-photographic materials (film products) (*Tekhnologiia kinofotomaterialov*).
OT: Technology engineer.
Gen: Chemical technology institutes.
Offerings: Regular—IV–29.

08XX—Materials technology for electronic and vacuum equipment (*Tekhnologiia elektrovakuumnykh materialov*).
OT: Not given in *Source Z.*
Ind: Moscow and Ivanovo Institutes of Chemical Technology. Program of study and decimal code are not known. Specialty listed in *Sprav VUZ–1958* and *1959.*
Offerings: Regular—VI–2.

08XY—Technology of isotope application and isotope separation (*Tekhnologiia razdeleniia i primeneniia izotopov*).
OT: Not given in *Source Z.*
Ind: Moscow Institute of Chemical Technology. Program of study and decimal code are not known. Specialty listed in *Sprav VUZ–1958.*
Offerings: Regular—II–14.

08XZ—Chemical technology (unspecified) (*Khimicheskaia tekhnologiia*).
OT: Not given in *Source Z.*
Ind or Gen: Not known. Program of study and decimal code not known. Specialty listed in *Sprav VUZ–1959.*
Offerings: Regular—I–4; I–17; II–3; II–18A.

SPECIALTY GROUP 9.—*Timber Engineering and Technology of Wood Processing, Cellulose, and Paper Manufacturing (Lesoinzhenernoe delo i tekhnologiia drevesiny, tselliulozy i bumagi).*
(Total in specialty group: 4).

0901—Timber engineering (*Lesoinzhenernoe delo*).
Specializations: (1) Technology of timbering; (2) logging.
OT: Technology engineer.
Gen: Forestry institutes.
Offerings: Regular—I–25; XII–35; XII–98; XII–101; XII–102; XII–103; XII–104; XII–105; XII–106; XII–107. Extension—XII–1.

0902—Mechanical technology of wood processing (*Mekhanicheskaia tekhnologiia drevesiny*).
Specializations: (1) technology of wood processing; (2) machinery and equipment of wood processing.
OT: Mechanical engineer.
Gen: Forestry institutes.
Offerings: Regular—II–9; VIII–4; IX–1; XII–35; XII–98; XII–99; XII–102; XII–103; XII–104; XII–105; XII–106; XII–107. Extension—XII–1.

0903—Chemical technology of wood processing (*Khimicheskaia tekhnologiia drevesiny*).
OT: Technology engineer.
Gen: Forestry institutes.
Offerings: Regular—XII–98; XII–102; XII–106; XII–107. Extension—XII–1.

0904—Technology of cellulose and paper industry (*Tekhnologiia tselliuloznobumazhnogo proizvodstva*).
OT: Technology engineer.
Gen: Forestry institutes and institutes of chemical technology.
Offerings: Regular—II–10; VI–5; XII–102; XII–104; XII–106.

SPECIALTY GROUP 10.—*Technology of Food Products Industry (Tekhnologiia prodovol'stvennykh produktov).*
(Total in specialty group: 13.)

1001—Storage and technology of grain processing (*Khranenie i tekhnologiia pererabotki zerna*).
OT: Technology engineer.
Gen: Food engineering institutes.
Offerings: Regular—VI–4; VII–1; VII–5; VII–7. Extension—VII–1.

1002—Technology of bread-baking, macaroni and related products and bakery goods industries (*Tekhnologiia khlebopekarnogo, makaronnogo i konditerskogo proizvodstva*).

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OT: Technology engineer.
Gen: Food engineering institutes.
Offerings: Regular—II–5; VII–1; VII–1A; VII–5; VII–10. Extension—VII–1.

1003—Technology of sugar and sugar products (candy) (*Tekhnologiia sakharistykh veshchestv*).
OT: Technology engineer.
Gen: Food engineering institutes.
Offerings: Regular—VII–1; VII–1A; VII–2; VII–5. Extension—VII–1. Evening—VI–4a.

1004—Technology of fermentation processes (brewing industry) (*Tekhnologiia brodil'nykh proizvodstv*).
Specializations: (1) beer and fermented nonalcoholic beverages; (2) alcohol, liqueur and vodka products.
OT: Technology engineer.
Gen: Food engineering institutes.
Offerings: Regular—II–3; II–19; VII–1; VII–1A; VII–2. Extension—VII–1.

1005—Technology of wine-making (*Tekhnologiia vinodeliia*).
OT: Technology engineer.
Gen: Food engineering institutes.
Offerings: Regular—II–19; VII–2; VII–5; VII–8. Extension—VII–1.

1006—Technology of vegetable fats (*Tekhnologiia rastitel'nykh zhirov*).
Specializations: (1) aromatic oils; (2) perfumes and cosmetics.
OT: Technology engineer.
Gen: Food engineering institutes.
Offerings: Regular—II–19; II–26; VII–2. Extension—VII–1.

1007—Technology of preserved and canned goods (*Tekhnologiia konservirovaniia*).
Specializations: (1) technology of canning; (2) refrigeration technology.
OT: Technology engineer.
Gen: Food engineering institutes.
Offerings: Regular—I–7; II–25; VII–2; VII–8; VII–10. Extension—VII–1.

1008—Technology of subtropical cultures (citrus, tea spices, etc.) (*Tekhnologiia subtropicheskikh kul'tur*).
Specializations: (1) technology of tobacco; (2) technology of tea and subtropical products.
OT: Technology engineer.
Gen: Food engineering institutes.
Offerings: Regular—VII–2; XII–34. Extension—VII–1.

1009—Technology of meat and dairy products (*Tekhnologiia miasnykh i molochnykh produktov*).
Specializations: (1) technology of meat and meat products; (2) technology of milk and dairy products.
OT: Technology engineer.
Gen: Food engineering institutes.
Offerings: Regular—II–9; II–19; II–25; VI–4; VII–4; VII–6; VII–8; VII–9; VII–10; VII–11A; XII–68; XII–69. Evening—VI–4a.

1010—Technology of fish products (*Tekhnologiia rybnykh produktov*).
OT: Technology engineer.
Gen: Food engineering institutes.
Offerings: Regular—II–21; VII–9; VII–10; VII–11A.

1011—Equipment and technology of public catering (*Oborudovanie i tekhnologiia obshchestvennogo pitaniia*).
OT: Technology engineer.
Gen: Institutes of trade.
Offerings: Regular—XIII–15; XIII–17; XIII–19; XIII–20. Extension—XIII–3.

1012—Industrial fisheries (*Promyshlennoe rybolovstov*).
OT: Mechanical engineer.
Gen: Institutes of the fish industry.
Offerings: Regular—VII–9; VII–10; VII–11A.

1013—Ichthyology, fish breeding and conservation (*Ikhtiologiia i rybovodstvo*).
OT: Ichthyologist.
Gen: Institutes of the fish industry.
Offerings: Regular—VII–9; VII–11A.

SPECIALTY GROUP 11.—*Technology of Consumer Goods Industry (Tekhnologiia tovarov shirokogo potrebleniia).*
(Total in specialty group: 9)

1101—Primary processing of fiber materials (*Pervichnaia obrabotka voloknistykh materialov*).
Specializations: (1) primary processing of bast fibers; (2) primary processing of cotton.
OT: Technology engineer.
Gen: Textile institutes.
Offerings: Regular—II–20; VIII–4; VIII–7. Extension—VIII–1.

1102—Mechanical technology of fiber materials (*Mekhanicheskaia tekhnologiia voloknistykh materialov*).
Specializations: (1) cotton spinning; (2) wool spinning; (3) bast products spinning; (4) technology of silk; (5) weaving technology; (6) knitting technology.
OT: Technology engineer.
Gen: Textile institutes and institutes for light industry.
Offerings: Regular—II–5; II–9; II–18A; II–20; VIII–1; VIII–3; VIII–4; VIII–5; VIII–6; VIII–7. Extension—VIII–1. Evening—VIII–6a.

1103—Chemical technology of fiber materials (*Khimicheskaia tekhnologiia voloknistykh materialov*).
OT: Technology engineer.
Gen: Textile institutes.
Offerings: Regular—II–21; VI–2; VIII–5; VIII–6. Extension—VIII–1. Evening—VIII–6a.

1104—Technology of synthetic fibers (*Tekhnologiia iskusstvennogo volokna*).
OT: Technology engineer.
Gen: Textile institutes.
Offerings: Regular—II–9; V–4; VI–2; VIII–1; VIII–5; VIII–6; VIII–7; XII–106. Extension—VIII–1.

1105—Technology of garment industry (*Tekhnologiia shveinogo proizvodstva*).
OT: Technology engineer.
Gen: Textile and light industry institutes.
Offerings: Regular—II–5; VIII–1; VIII–2; VIII–3; VIII–4; VIII–5; VIII–7. Extension—VIII–1. Evening—II–9a.

1106—Technology of leather and fur industry (*Tekhnologiia kozhi i mekha*).
OT: Technology engineer.
Gen: Light industry institutes.
Offerings: Regular—VIII–1; VIII–2; XII–68. Extension—VIII–1. Evening—VI–4a.

1107—Technology of synthetic leather materials (*Teknologiia izdelii iskusstvennoi kozhi*).
OT: Technology engineer.
Gen: Light industry institutes.
Offerings: Regular—VI–3; VIII–2. Extension—VIII–1.

1108—Technology of manufactured leather goods (*Tekhnologiia izdelii iz kozhi*).
OT: Technology engineer.
Gen: Light industry institutes.
Offerings: Regular—II–5; II–9; VIII–1; VIII–2. Extension—VIII–1.

1109—Technology of printing and publishing (*Tekhnologiia poligraficheskogo proizvodstva*).
OT: Technology engineer.
Gen: Polygraphic institutes.
Offerings: Regular—II–5; IV–27; IV–28. Extension—IV–2.

SPECIALTY GROUP 12.—*Construction (Stroitel'stvo)*
(Total in specialty group: 15.)

1201—Architecture (*Arkhitektura*).
OT: Not given in *Source Z.*
Gen: Civil engineering institutes, construction institutes, etc.
Offerings: Regular—II–1; II–3; II–5; II–8; II–9; II–18A; II–19; II–23; IX–6; IX–8; IX–11; XV–1; XV–4; XV–5; XV–7; XV–8; XV–11.

1202—Industrial and civil construction (*Promyshlennoe i grazhdanskoe stroitel'stvo*).
OT: Civil-construction engineer.
Gen: Construction institutes.
Offerings: Regular—I–7; I–12; I–21; I–25; I–33; I–39;

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II–1; II–3; II–5; II–6; II–7; II–8; II–9; II–11; II–12; II–15; II–16; II–18A; II–19; II–20; II–21; II–23; II–24; II–25; II–27; V–1; V–3; V–5; V–11; V–12; V–16; V–19; V–21; V–22; V–26; V–27; VI–4; IX–1; IX–2; IX–3; IX–4; IX–5; IX–6; IX–7; IX–8; IX–9; IX–10; IX–11; IX–12; IX–13; IX–14; IX–15; IX–17; IX–17A; IX–18; IX–24; IX–26; XI–1; XI–2; XI–4; XI–6; XI–8; XI–12; XII–68; XII–98. Extension—II–1; IX–1; IX–2; XI–1. Evening—I–25a; II–3b; II–7a; II–7b; II–9a; II–13b; II–13c; II–19a; II–19b; II–23a; II–23b; IX–3a; IX–12a.

1203—Hydrotechnical construction of river installations and hydroelectric power stations (*Gidrotekhnicheskoe stroitel'stvo rechnykh sooruzhenii i gidroelektrostantsii*).
OT: Civil-hydrotechnical construction engineer.
Ind: Moscow Construction Engineering Institute and
Gen: Other construction institutes.
Offerings: Regular—II–3; II–5; II–9; II–14; II–19; II–25; III–3; IX–7; IX–9; IX–11; IX–12; IX–17; XII–93; XII–94. Extension—II–1; IX–1.

1204—Hydrotechnical construction of maritime waterways and harbors (*Gidrotekhnicheskoe stroitel'stvo vodnykh morskikh putei i portov*).
OT: Civil-hydrotechnical construction engineer.
Gen: Construction institutes.
Offerings: Regular—II–6; II–14; IX–9; XI–15; XI–16; XI–17.

1205—Agricultural construction (*Sel'skokhoziaistvennoe stroitel'stvo*).
OT: Civil-construction engineer.
Gen: Construction institutes.
Offerings: Regular—II–9; VI–4; IX–14; XII–68. Extension —IX–1.

1206—Urban construction and municipal works and service installations (*Gorodskoe stroitel'stvo i khoziaistvo*).
OT: Civil-construction engineer.
Gen: Construction institutes.
Offerings: Regular—II–9; II–23; II–27; IX–6; IX–8; IX–9; IX–16; IX–19. Extension—II–1; IX–1.

1207—Production of concrete and reinforced concrete structural components and units for prefabricated construction (revised) (*Proizvodstvo betonnykh i zhelezobetonnykh izdelii i konstruktsii dlia sbornogo stroitel'stva*)
OT: Civil-construction engineer.
Gen: Construction institutes
Offerings: Regular—II–9; II–12; II–27; V–3; V–22; VI–4; IX–1; IX–3; IX–4; IX–5; IX–6; IX–7; IX–9; IX–10; IX–11; IX–12; IX–13; IX–15. Extension—II–1; IX–1. Evening—VI–4a.

1208—Gas and heat supply and ventilation (*Teplogazosnabzhenie i ventiliatsiia*)
OT: Civil-construction engineer.
Gen: Construction institutes
Offerings: Regular—II–1; II–3; II–5; II–8; II–18A; II–19; II–23; IX–2; IX–6; IX–7; IX–8; IX–9; IX–10; IX–11; IX–12; IX–13; IX–14; IX–16; IX–18; IX–24. Extension —II–1; IX–1.

1209—Water supply and sewerage systems (*Vodosnabzhenie i kanalizatsiia*)
OT: Civil-construction engineer.
Gen: Construction institutes
Offerings: Regular—I–33; II–1; II–3; II–5; II–8; II–9; II–16; II–19; II–20; II–21; II–23; II–27; VI–4; IX–2; IX–6; IX–7; IX–8; IX–9; IX–10; IX–11; IX–12; IX–13; IX–14; IX–16; IX–18; XI–3. Extension—II–1; IX–1.

1210—Railroad construction (*Stroitel'stvo zheleznykh dorog*)
OT: Civil-railroad construction engineer
NOTE.—Two programs are in existence: one for engineering institutes, the other for institutes of railroad transport
Offerings: Regular—IX–15; XI–1; XI–2; XI–3; XI–4; XI–6; XI–8; XI–9; XI–12; XI–13. Extension—XI–1.

1211—Automobile roads (*Avtomobil'nye dorogi*)
OT: Civil-road construction engineer
Gen: Institutes of automotive transport
Offerings: Regular—II–1; II–3; II–5; II–8; II–12; II–15; II–18A; II–19; II–21; II–25; IX–8; IX–10; IX–16; IX–17; IX–17A; IX–22; IX–23; IX–24; IX–25; IX–26; IX–27. Extension—II–1; IX–1; IX–2.

1212—Bridges and tunnels (*Mosty i tonneli*)
NOTE.—Two programs are in existence: one for transport institutes, the other for institutes of railroad transport
OT: Civil-construction engineer for bridges and tunnels
Offerings: Regular—IX–23; IX–24; XI–3; XI–4; XI–6. Extension—IX–2; XI–1.

1213—Construction of airports (*Stroitel'stvo aerodromov*)
NOTE.—This specialty does not appear in *VyShkoSPR–1957*, but is listed in *Source Z*.
OT: Civil-construction engineer
Gen: Automotive transport institutes
Offerings: Regular—IX–23.

12XX—Finishing and furnishing of buildings (*Otdelka i oborudovanie zdanii*)
OT: Not given in *Source Z*
Ind: Moscow Institute of Architecture and Leningrad Art School. Program of study and decimal code are not known. Specialty listed in *Sprav VUZ–1958* and *1959*.
Offerings: Regular—XV–2; XV–3.

12XY—Construction of pipelines (*Sooruzhenie gazonefteprovodov*)
OT: Not given in *Source Z*
Ind or Gen: Not known. Program of study and decimal code not known. Specialty listed in *Sprav VUZ–1959*.
Offerings: Regular—V–8.

SPECIALTY GROUP 13.—*Geodesy and Cartography (Geodeziia i kartografiia)*
(Total in specialty group: 4)

1301—Engineering geodesy (*Inzhenernaia geodeziia*)
OT: Engineer-geodesist
Gen: Institutes of geodesy, aerial photography and cartography
Offerings: Regular—II–9; II–15; IX–6; IX–20; IX–21; XII–95.

1302—Astro-geodesy (stellar geodesy) (*Astronomogeodeziia*)
OT: Engineer-astrogeodesist; *Source Y* gives specialty of astronomer-geodesist, or astronomer, with individual study program of 5½ years offered at Kazan' University.
Gen: Institutes of geodesy, aerial photography and cartography
Offerings: Regular—I–13; II–15; IX–20; IX–21.

1303—Aerial photography goedesy (*Aerofotogeodeziia*)
OT: Engineer-geodesist
Gen: Institutes of geodesy, aerial photography and cartography
Offerings: Regular—II–15; IX–20; IX–21.

1304—Cartography (*Kartografiia*)
Specializations: (1) preparation of maps; (2) publishing of maps
OT: Engineer-cartographer. Moscow University offers an individual program for geographer-cartographer with the length of study 5½ years (*Source Y*).
Gen: Institutes of geodesy, aerial photography and cartography
Offerings: Regular—I–22; IX–20; IX–21.

SPECIALTY GROUP 14.—*Hydrology and Meteorology (Gidrologiia i meteorologiia)*
(Total in specialty group: 5)

1401—Hydrology of land (revised) (*Gidrologiia sushi*)
OT: Engineer-hydrologist
Gen: Universities and institutes of hydrometeorology. University training lasts 5½ years (*Source Y*).
Offerings: Regular—I–5; I–8; I–22; I–28; I–32; X–1; X–2.

1402—Oceanography (revised) (*Okeanologiia*)
OT: Engineer-oceanographer
Gen: Universities and institutes of hydrometeorology. University training lasts 5½ years (*Source Y*).
Offerings: Regular—I–22; X–1; XI–19.

1403—Hydrography (*Gidrografiia*)
OT: Not given in *Source Z*

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Ind or *Gen:* Not known. Program of study not known. Specialty listed in *Sprav VUZ–1958* and *1959*.
Offerings: Regular–XI–19.

1404—Meteorology (revised) (*Meteorologiia*)
OT: Engineer-meteorologist
Gen: Universities and institutes of hydrometeorology. University training lasts 5½ years (*Source Y*).
Offerings: Regular–I–5; I–8; I–13; I–19; I–22; I–32; X–1; X–2.

1405—Agricultural meteorology (*Agrometeorologiia*)
OT: Engineer-agricultural meteorologist
Gen: Universities only
Offerings: Regular–X–2.

SPECIALTY GROUP 16.—Transportation (operations and exploitation) (*Transport, ekspluatatsiia*)
(Total in specialty group: 12.)

1601—Rolling stock and locomotive park of railroad transport (*Podvizhnoi sostav i tiagovoe khoziaistvo zheleznodorozhnogo transporta*).
Specializations: (1) steam locomotives and locomotive park; (2) diesel locomotives and park; (3) cars and car park.
OT: Mechanical engineer for railroad transport.
Offerings: Not found in *Sprav VUZ–1958* or *1959*.

1602—Electrification of railroad transport (maintenance and operations) (*Elektrifikatsiia zheleznodorozhnogo transporta*).
OT: Electrical engineer for railroad transport.
Gen: Institutes of railroad transport.
Offerings: Regular–XI–2; XI–3; XI–4; XI–7; XI–9; XI–10; XI–11; XI–12.

1603—Automatics, telemechanics, and communications in railroad transport (*Avtomatika, telemekhanika i sviaz' na zheleznodorozhnom transporte*).
Specializations: (1) automatics and telemechanics; (2) communications.
OT: Electrical engineer for railroad transport.
Gen: Institutes of railroad transport.
Offerings: Regular–XI–3; XI–8; XI–10; XI–11; XI–13.

1604—Operations and exploitation of railroads (*Ekspluatatsiia zheleznykh dorog*).
OT: Operations and traffic engineer.
Gen.: Institutes of railroad transport.
Offerings: Regular–V–2A; XI–1; XI–2; XI–3; XI–4; XI–6; XI–7; XI–8; XI–12; XI–13.

1605—Municipal electrified transport (*Gorodskoi elektricheskii transport*).
OT: Electrical engineer.
Gen: Institutes of automotive transport.
Offerings: Regular–III–3; IX–19.

1606—Maritime navigation (*Sudovozhdenie na morskikh putiakh*).
OT: Engineer navigator.
Ind: Leningrad Maritime Academy and special divisions of higher maritime schools; 5½ year program of training.
Offerings: Regular–XI–18; XI–19; XI–20; XI–21.

1607—Internal waterway navigation (*Sudovozhdenie na vnutrennikh vodnykh putiakh*).
OT: Engineer-navigator.
Gen: Institutes of water transport.
Offerings: Regular–XI–14; XI–16.

1608—Operations and exploitation in maritime and waterway shipping of water transport (*Ekspluatatsiia vodnogo transporta*).
OT: Operations and traffic engineer.
Gen: Institutes of water transport.
Offerings: Regular–XI–14; XI–16; XI–17.

1609—Operations and exploitation in automotive transport (*Ekspluatatsiia avtomobil'nogo transporta*).
OT: Mechanical engineer.
Gen: Automotive transport institutes.
Offerings: Regular–II–1; II–3; II–5; II–9; II–12; II–16; II–19; II–20; II–21; II–25; II–27; IX–17A; IX–22; IX–23; IX–24; IX–25; IX–26; IX–27. Extension–II–1; II–2. Evening–II–3a.

1610—Operations and exploitation of aircrafts and engines (*Ekspluatatsiia samoletov i dvigatelei*)
OT: Mechanical engineer.
Ind: Kiev Institute of Civil Aeronautics; 5½-year program of training.
Offerings: Regular–IV–21; IV–26; XI–21.

16XX—Operation and exploitation of electrical and communication equipment of aircrafts and airports (*Tekhnicheskaia ekspluatatsiia elektroradiosvetooborudovaniia samoletov*).
OT: Not given in *Source Z*.
Ind: Civil Aviation Institute in Kiev. Program of study and decimal code are not known. Specialty listed in *Sprav VUZ–1958* and *1959*.
Offerings: Regular–XI–22.

16XY—Exploitation of gas and oil pipelines (*Ekspluatatsiia gazonefteprovodov*).
OT: Not given in *Source Z*.
Ind or *Gen:* Not known. Program of study and decimal code are not known. Specialty listed in *Sprav VUZ–1959*.
Offerings: Regular–V–18.

BRANCH II.—AGRICULTURE AND FORESTRY
(Total in branch: 12)

SPECIALTY GROUP 15.—*Agriculture and Forestry (Sel'skoe i lesnoe khoziaistvo)*
(Total in specialty group: 12)

1501—Soil science and agro-chemistry (*Pochvovedenie i agrokhimiia*)
OT: Professional agronomist.
Gen: Agricultural institutes. Universities offer a profile for training agro-chemists, with the length of training 5½ years (*Source Y*).
Offerings: Regular–I–5; I–8; I–11; I–13; I–17; I–19; I–22; I–28; I–32; XII–1; XII–7; XII–41; XII–47; XII–60; XII–63.

1502—Agronomy (*Agronomiia*).
OT: Professional agronomist.
Gen: Agricultural institutes.
Offerings: Regular–I–12; I–21; I–25; XII–2; XII–3; XII–4; XII–5; XII–6; XII–7; XII–8; XII–9; XII–10; XII–11; XII–12; XII–13; XII–14; XII–15; XII–16; XII–17; XII–18; XII–19; XII–20; XII–21; XII–22; XII–23; XII–24; XII–25; XII–26; XII–27; XII–28; XII–29; XII–30; XII–31; XII–32; XII–33; XII–34; XII–35; XII–36; XII–37; XII–38; XII–39; XII–40; XII–41; XII–42; XII–43; XII–44; XII–45; XII–46; XII–47; XII–48; XII–49; XII–50; XII–51; XII–52; XII–53; XII–54; XII–55; XII–56; XII–57; XII–58; XII–59; XII–60; XII–61; XII–62; XII–63; XII–64; XII–65; XII–66; XII–68. Extension–XII–2

1503—Fruit, vegetable, and grape growing (*Plodoovoshchevodstvo i vinogradarstvo*)
OT: Professional agronomist.
Gen: Agricultural institutes
Offerings: Regular–XII–1; XII–5; XII–14; XII–26; XII–29; XII–30; XII–36; XII–40; XII–41; XII–43; XII–44; XII–57; XII–62. Extension–XII–2.

1504—Plant protection (*Zashchita rastenii*)
OT: Professional agronomist.
Gen: Agricultural institutes
Offerings: Regular–XII–36; XII–41; XII–57; XII–63.

1505—Sericulture (*Shelkovodstvo*)
OT: Professional agronomist.
Gen: Agricultural institutes
Offerings: Regular–XII–34; XII–57; XII–58.

1506—Zootechnics (animal breeding) (*Zootekhniia*).
OT: Professional zootechnic.
Gen: Zootechnical institutes.
Offerings: Regular–I–12; I–21; I–25; I–39; XII–1; XII–4; XII–6; XII–7; XII–8; XII–9; XII–10; XII–12; XII–13; XII–15; XII–18; XII–19; XII–20; XII–23; XII–24; XII–25; XII–26; XII–27; XII–28; XII–30; XII–32;

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XII–33; XII–35; XII–36; XII–41; XII–42; XII–43; XII–44; XII–45; XII–46; XII–47; XII–48; XII–49; XII–50; XII–52; XII–53; XII–54; XII–55; XII–56; XII–58; XII–59; XII–60; XII–61; XII–64; XII–65; XII–66; XII–67; XII–68; XII–69; XII–70; XII–71; XII–72; XII–73; XII–74; XII–76; XII–77; XII–78; XII–79; XII–81; XII–82; XII–83; XII–85.

1507—Veterinary medicine (*Veterinariia*).
OT: Veterinarian.
Gen: Veterinary institutes.
Offerings: Regular—I–39; VII–6; XII–1; XII–6; XII–7; XII–8; XII–15; XII–24; XII–25; XII–37; XII–45; XII–54; XII–58; XII–59; XII–60; XII–61; XII–66; XII–67; XII–68; XII–70; XII–71; XII–72; XII–73; XII–74; XII–75; XII–76; XII–77; XII–78; XII–79; XII–80; XII–81; XII–82; XII–83; XII–84.

1508—Land utilization management (*Zemleustroistvo*).
OT: Conservation engineer.
Gen: Agricultural institutes.
Offerings: Regular—XII–3; XII–7; XII–11; XII–35; XII–38; XII–44; XII–63; XII–95; XII–97.

1509—Mechanization of agricultural production processes (*Mekhanizatsiia protsessov sel'skokhoziaistvennogo proizvodstva*).
OT: Mechanical engineer.
Gen: Institutes of mechanization of agriculture.
Offerings: Regular—I–21; XII–1; XII–3; XII–4; XII–5; XII–6; XII–7; XII–9; XII–11; XII–12; XII–14; XII–16; XII–19; XII–20; XII–21; XII–22; XII–24; XII–25; XII–26; XII–27; XII–28; XII–30; XII–31; XII–35; XII–36; XII–37; XII–38; XII–42; XII–44; XII–45; XII–46; XII–47; XII–50; XII–52; XII–53; XII–54; XII–55; XII–56; XII–58; XII–60; XII–61; XII–66; XII–69; XII–86; XII–87; XII–88; XII–89; XII–90; XII–91; XII–92; XII–94; XII–97. Extension—XII–2.

1510—Electrification of agricultural production processes (*Elektrifikatsiia protsessov sel'skokhoziaistvennogo proizvodstva*)
OT: Electrical engineer.
Gen: Institutes of electrification of agriculture
Offerings: Regular—XII–22; XII–36; XII–55; XII–60; XII–87; XII–89; XII–90; XII–91; XII–92. Extension—XII–2.

1511—Hydromelioration (*Gidromelioratsiia*)
OT: Engineer-hydrologist
Gen: Institutes of hydromelioration
Offerings: Regular—II–1; XII–7; XII–22; XII–35; XII–37; XII–44; XII–66; XII–93; XII–94; XII–96; XII–97. Extension—XII–2.

1512—Forestry (*Lesnoe khoziaistvo*).
Specializations: (1) forestry; (2) forestry melioration; (3) artificial forestation.
OT: Forest engineer.
Gen: Forestry institutes.
Offerings: Regular—XII–14; XII–22; XII–31; XII–35; XII–37; XII–49; XII–51; XII–60; XII–66; XII–96; XII–98; XII–99; XII–100; XII–101; XII–102; XII–103; XII–104; XII–105; XII–106; XII–107. Extension—XII–1.

BRANCH III.—SOCIO-ECONOMIC SPECIALTIES
(Total in branch: 41)

Specialty Group 17.—*Economics (Ekonomika)*
(Total in specialty group: 39.)

1701—Planning of national economy (*Planirovanie narodnogo khoziaistva*).
OT: Economist.
Gen: Economic institutes. Length of training is 4½ years (*Source Y*).
Offerings: Regular—XIII–4. Extension—XIII–1.

1702—Economics of industry (*Ekonomika promyshlennosti*)
OT: Economist
Gen: Economic institutes. Length of training is 4½ years (*Source Y*).
Offerings: Regular—XIII–2; XIII–3; XIII–4; XIII–6; XIII–7; XIII–9; XIII–10; XIII–13; XIII–14. Extension—XIII–1.

1703—Economics and planning of material-technical supply (*Ekonomika i planirovanie material'no-tekhnicheskogo snabzheniia*)
OT: Economist
Gen: Economic institutes. Length of training is 4½ years (*Source Y*).
Offerings: Regular—XIII–3; XIII–4; XIII–23. Extension—XIII–1.

1704—Economics of labor (*Ekonomika truda*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XIII–4; XIII–21. Extension—XIII–1.

1705—Economics and organization of mining industry (*Ekonomika i organizatsiia gornoi promyshlennosti*)
OT: Mining engineer economist
Gen: Institutes of engineering economics. 5½-year program for persons without employment experience; 4 years, 10 months, for persons with employment experience (*Source Y*).
Offerings: Regular—V–2; V–4; V–6; V–8; XIII–7; XIII–23. Extension—II–1.

1706—Economics and organization of oil and gas industry (*Ekonomika i organizatsiia neftianoi i gazovoi promyshlennosti*).
OT: Not available.
Gen: Not available.
Offerings: Regular—II–2; V–9. Extension—II–1.

1707—Economics and organization of (electric) power industry (*Ekonomika i organizatsiia energetiki*)
OT: Engineer economist.
Gen: Institutes of engineering economics. 5½-year program for persons without employment experience; 4 years, 10 months, for persons with employment experience (*Source Y*).
Offerings: Regular—XIII–21; XIII–22. Extension—II–1.

1708—Economics and organization of metallurgical industry (*Ekonomika i organizatsiia metallurgicheskoi promyshlennosti*)
OT: Not available.
Gen: Not available.
Offerings: II–23; V–6; V–17; XIII–23. Extension—II–1.

1709—Economics and organization of machine building industry (*Ekonomika i organizatsiia mashinostroitel'noi promyshlennosti*)
OT: Engineer-economist
Gen: Engineering-economics institutes; 1954: 5-year program of study; 1959; 5½-year program for persons without employment experience; 4 years, 10 months, for persons with employment experience (*Source Y*).
Offerings: Regular—II–9; II–14; II–21; II–23; IV–24; XIII–21; XIII–22; XIII–23. Extension—II–1.

1710—Economics and organization of shipbuilding industry (*Ekonomika i organizatsiia sudostroitel'noi promyshlennosti*)
OT: Not available.
Gen: Not available.
Offerings: Not found in *Sprav VUZ–1958* or *1959*.

1711—Economics and organization of chemical industry (*Ekonomika i organizatsiia khimicheskoi promyshlennosti*).
OT: Engineer economist.
Gen: Engineering-economics institutes. 5½-year program for persons without employment experience; 4 years, 10 months, for persons with employment experience (*Source Y*).
Offerings: Regular—II–23; XIII–21; XIII–22; XIII–23. Extension—II–1; IX–1.

1712—Economics and organization of polygraphic (printing and publishing) industry (*Ekonomika i organizatsiia poligraficheskoi promyshlennosti*).
OT: Not available.
Gen: Not available.
Offerings: Regular—IV–27; IV–28. Extension—IV–2.

1713—Economics of cinematography (*Ekonomika kinematografii*).

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OT: Not available.
Gen: Not available.
Offerings: Not found in *Sprav VUZ–1958* or *1959*.

1714—Economics and organization of consumer goods industry (*Ekonomika i organizatsiia promyshlennosti predmetov shirokogo potrebleniia*)
OT: Not available.
Gen: Not available.
Offerings: Regular—VIII–1; VIII–2; VIII–5; VIII–6; VIII–7. Extension—VIII–1. Evening—VIII–6a.

1715—Economics and organization of agriculture (*Ekonomika i organizatsiia sel'skogo khoziaistva*)
NOTE.—agronomist-economist programs requiring 5 years of study.
OT: Not available.
Gen: Not available.
Offerings: Regular—XII–7; XII–11; XII–14; XII–36; XII–37; XII–38; XII–41; XII–44; XII–51; XII–57; XII–63. Extension—XII–2.

1716—Economics of agriculture (*Ekonomika sel'skogo khoziaistva*).
NOTE.—Economist programs requiring 4 years of study.
OT: Not available.
Gen: Not available.
Offerings: Regular—XII–60; XIII–3; XIII–4; XIII–6; XIII–7; XIII–9; XIII–13; XIII–14. Extension—XIII–1.

1717—Economics and organization of agricultural produce procurements (*Ekonomika i organizatsiia zagotovok produktov sel'skogo khoziaistva*).
OT: Not available.
Gen: Not available.
Offerings: Not listed in *Sprav VUZ–1958* or *1959*.

1718—Economics and organization of food products industry (*Ekonomika i organizatsiia promyshlennosti prodovol'stvennykh tovarov*).
OT: Not available.
Gen: Not available.
Offerings: Regular—VII–5; VII–6; VII–7. Extension—VII–1.

1719—Economics and organization of forestry and timber industry (*Ekonomika i organizatsiia lesnogo khoziaistva i lesnoi promyshlennosti*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XII–102; XII–104. Extension—XII–1.

1720—Economics and organization of wood-processing and cellulose and paper industry (*Ekonomika i organizatsiia derevoobrabatyvaiushchei i tselliuloznobumazhnoi promyshlennosti*).
OT: Not available.
Gen: Not available.
Offerings: Regular—VI–5; XII–102; XII–104. Extension XII–1.

1721—Economics and organization of construction (*Ekonomika i organizatsiia stroitel'stva*).
OT: Engineer economist.
Gen: Engineering-economics institutes. 5½-year program for persons without employment experience; 4 years, 10 months, for persons with employment experience (*Source Y*).
Offerings: Regular—IX–19; XIII–7; XIII–22. Extension—II–1; IX–1; XI–1.

1722—Economics and organization of municipal economy (*Ekonomika i organizatsiia gorodskogo khoziaistva*).
OT: Engineer-economist.
Gen: Engineering-economics institutes. 5½-year program for persons without employment experience; 4 years, 10 months, for persons with employment experience (*Source Y*).
Offerings: Regular—IX–19; XIII–21; XIII–22. Extension —IX–1.

1723—Economics and organization of railroad transport (*Ekonomika i organizatsiia zheleznodorozhnogo transporta*)
OT: Not available.
Gen: Not available.
Offerings: Regular—XI–4; XI–8; XI–13. Extension—XI–1.

1724—Economics and organization of water transport (*Ekonomika i organizatsiia vodnogo transporta*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XI–15.

1725—Economics and organization of automotive transport (*Ekonomika i organizatsiia avtomobil'nogo transporta*)
OT: Engineer-economist.
Gen: Engineering-economics institutes. 5½-year program for persons without employment experience; 4 years, 10 months, for persons with employment experience (*Source Y*).
Offerings: Regular—XIII–22.

1726—Economics and organization of air transport (*Ekonomika i organizatsiia vozdushnogo transporta*).
OT: Engineer-economist.
Gen: Engineering-economics institutes. 5½-year program for persons without employment experience; 4 years, 10 months, for persons with employment experience (*Source Y*).
Offerings: Not listed in *Sprav VUZ–1958* or *1959*.

1727—Originally was economics of joint transportation activities. *Source Y* states that it has been reconstituted as:
Economics of national economy (*Ekonomika narodnogo khoziaistva*).
OT: Economist.
Gen: Universities. Length of training 5 years (*Source Y*).
Offerings: Not known.

1728—Economics and organization of communication (*Ekonomika i organizatsiia sviazi*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XI–26. Extension—XI–2.

1729—Economics of trade (*Ekonomika torgovli*).
OT: Not available.
Gen: Not available.
Offerings: Regular—I–30; XIII–2; XIII–7; XIII–15; XIII–16; XIII–17; XIII–18; XIII–19; XIII–20. Extension—XIII–3.

1730—Economics of public catering (*Ekonomika obshchestvennogo pitaniia*).
OT: Not available.
Gen: Not available.
Offerings: Not listed in *Sprav VUZ–1958* or *1959*

1731—Economics of foreign trade (*Ekonomika vneshnei torgovli*).
OT: Not available.
Gen: Not available.
Offerings: Not listed in *Sprav VUZ–1958* or *1959*.

1732—Merchandising of industrial goods (*Tovarovedenie promyshlennykh tovarov*)
OT: Merchandising specialist
Gen: Program of study in universities is 5 years (*Source Y*).
Offerings: Regular—XIII–2; XIII–15; XIII–17; XIII–18; XIII–19; XIII–20; I–1. Extension—XIII–3.

1733—Merchandising of food products (*Tovarovedenie prodovol'stvennykh tovarov*).
OT: Merchandising specialist.
Gen: Program of study in universities is 5 years (*Source Y*).
Offerings: Regular—XIII–2; XIII–15; XIII–17; XIII–18; XIII–19; XIII–20. Extension—XIII–3.

1734—Finance and credit (domestic banking, monetary and fiscal operations (*Finansy i kredit*).
OT: Economist.
Gen: Program in universities is 5 years (*Source Y*). Program in economics institutes is 4 years, 6 months (2 programs of study are given in *Source Y*).
Offerings: Regular—I–1; I–4; I–10; I–14; I–17; I–18; I–30; I–31; XIII–2; XIII–4; XIII–6; XIII–7; XIII–8; XIII–9; XIII–10; XIII–11; XIII–12; XIII–13; XIII–14; XIII–16. Extension—XIII–2.

1735—International monetary-financial transactions (*Mezhdunarodnye valiutnofiansovye otnosheniia*).
OT: Not available.
Gen: Not available.

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Offerings: Not listed in *Sprav VUZ–1958* or *1959*.

1736—Statistics (statistical reporting) (*Statistika*)
OT: Economist
Gen: Length of study in economics institutes is 4 years, 6 months (*Source Y*).
Offerings: Regular—XIII–5; XIII–9; XIII–10; XIII–14. Extension—XIII–1.

1737—Accounting (*Bukhgalterskii uchet*)
OT: Accountant-economist
Gen: Length of study in universities is 5 years, in economics institutes 4 years, 6 months (2 programs of study are given in *Source Y*).
Offerings: Regular—I–1; I–4; I–10; I–14; I–24; I–30; I–31; XII–7; XII–11; XII–14; XII–36; XII–37; XII–38; XII–41; XII–44; XII–51; XII–57; XII–60; XII–63; XIII–2; XIII–6; XIII–7; XIII–8; XIII–9; XIII–10; XIII–11; XIII–12; XIII–13; XIII–14; XIII–15; XIII–16; XIII–17; XIII–19; XIII–20. Extension—XII–2; XIII–1; XIII–2; XIII–3.

1738—Mechanization of accounting and calculation (*Mekhanizatsiia ucheta i vychislitel'nykh rabot*)
OT: Engineer economist.
Ind: Moscow Institute of Economic Statistics. Length of study is 5 years, 5 months, for persons without employment experience; and 5 years for persons with employment experience (2 programs are given in *Source Y*).
Offerings: Regular—XIII–5; XIII–16.

17XX—Economics of the national economy (*Ekonomika narodnogo khoziaistva*).
OT: Not available.
Gen: Not available. Program of study and decimal code not known. Specialty listed in *Sprav VUZ–1959*.
Offerings: Regular—I–1; I–4; I–10; I–14; I–16; I–17; I–18; I–24; I–29; I–31; I–32.

SPECIALTY GROUP 18.—*Jurisprudence (Pravo)*
(Total in specialty group: 2.)

1801—Jurisprudence (*Pravovedenie*).
OT: Jurist
Gen: Universities (5-year program) and jurisprudence institutes (4 years and 4 months) (*Source Y*).
Offerings: Regular—I–1; I–3; I–4; I–8; I–10; I–11; I–13; I–14; I–15; I–16 I–18; I–19; I–20; I–22; I–24; I–26; I–28; I–29; I–30; I–31; I–32; XIV–1; XIV–2; XIV–3. Extension—XIV–1.

1802—International relations (*Mezhdunarodnye otnosheniia*).
OT: Not available.
Gen: Not available.
Offerings: Not listed in *Sprav VUZ–1958* or *1959*

BRANCH IV.—MEDICAL AND HEALTH SPECIALTIES
(Total in branch: 6)

SPECIALTY GROUP 19.—*Public Health and Physical Culture (Zdravookhranenie i fizicheskaia kul'tura)*
(Total in specialty group: 6)

1901—Medical doctors (physicians, general practitioners and specialists) (*Lechebnoe delo*)
OT: Not available.
Gen: Not available.
Offerings: Regular—I–4; I–30; I–34; I–39; II–6; XVI–1; XVI–2; XVI–3; XVI–4; XVI–5; XVI–6; XVI–7; XVI–8; XVI–9; XVI–10; XVI–10A; XVI–11; XVI–12; XVI–13; XVI–14; XVI–15; XVI–16; XVI–17; XVI–18; XVI–19; XVI–20; XVI–21; XVI–22; XVI–23; XVI–24; XVI–25; XVI–26; XVI–27; XVI–28; XVI–29; XVI–30; XVI–31; XVI–32; XVI–33; XVI–36; XVI–37; XVI–38; XVI–39; XVI–40; XVI–41; XVI–42; XVI–43; XVI–44; XVI–45; XVI–46; XVI–47; XVI–48; XVI–49; XVI–50; XVI–51; XVI–52; XVI–53; XVI–54; XVI–55; XVI–56; XVI–57; XVI–58; XVI–59; XVI–60; XVI–61; XVI–62; XVI–63; XVI–64; XVI–65; XVI–66; XVI–67; XVI–68; XVI–69; XVI–70.

1902—Medical doctors in pediatrics (*Pediatriia*)
OT: Not available.
Gen: Not available.
Offerings: Regular—I–30; XVI–1; XVI–11; XVI–12; XVI–14; XVI–16; XVI–19; XVI–20; XVI–25; XVI–26; XVI–27; XVI–29; XVI–35; XVI–37; XVI–40; XVI–42; XVI–43; XVI–46; XVI–47; XVI–50; XVI–51; XVI–58; XVI–60; XVI–61; XVI–63; XVI–65; XVI–66.

1903—Public health, hygiene and sanitation (*Sanitariia*).
OT: Not available.
Gen: Not available.
Offerings: Regular—I–30; XVI–1; XVI–14; XVI–15; XVI–18; XVI–20; XVI–25; XVI–26; XVI–34; XVI–37; XVI–39; XVI–42; XVI–43; XVI–47; XVI–51; XVI–58; XVI–60; XVI–61; XVI–66.

1904—Stomatology (*Stomatologiia*).
OT: Not available.
Gen: Not available.
Offerings: Regular—I–30; XVI–1; XVI–4; XVI–11; XVI–15; XVI–18; XVI–19; XVI–21; XVI–23; XVI–25; XVI–34; XVI–37; XVI–42; XVI–43; XVI–45; XVI–46; XVI–55; XVI–60; XVI–61; XVI–69; XVI–71; XVI–72.

1905—Pharmaceutics (*Farmatsiia*).
OT: Not available.
Gen: Not available.
Offerings: Regular—I–30; XVI–1; XVI–14; XVI–18; XVI–20; XVI–23; XVI–37; XVI–39; XVI–46; XVI–61; XVI–65; XVI–73; XVI–75; XVI–76; XVI–77; XVI–78; XVI–79.

1906—Physical culture and sports (*Fizicheskaia kul'tura i sport*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVII–1; XVII–2; XVII–3; XVII–4; XVII–5; XVII–6; XVII–7; XVII–8; XVII–9; XVII–10; XVII–11; XVII–12; XVII–13; XVII–14; XVII–15.

BRANCH V.—EDUCATION, PURE (THEORETICAL) SCIENCES, CULTURAL SERVICES, ARTS AND ENTERTAINMENT FIELD SPECIALTIES
(Total in branch: 106)

SPECIALTY GROUP 20.—*University Specialties* (Spetsial'nosti v universitetakh)*
(Total in specialty group: 32)

2001—Russian language and literature (*Russkii iazyk i literatura*)
OT: (1) Philologist: teacher of Russian language and literature; (2) philologist: literary worker; (3) philologist: librarian and bibliographer.
Gen: Universities
Offerings: Regular—I–1; I–2; I–3; I–4; I–5; I–6; I–7; I–8; I–9; I–10; I–11; I–12; I–13; I–14; I–15; I–16; I–17; I–18; I–19; I–20; I–21; I–22; I–23; I–24; I–25; I–26; I–27; I–28; I–29; I–30; I–31; I–32; I–33; I–34; I–35; I–36; I–37; I–38; I–39. Evening—I–25a.

2002—Native language and literature of peoples of the U.S.S.R. (*Rodnoi iazyk i literatura narodov SSSR*):

a. Ukrainian
b. Belorussian
c. Uzbek
d. Kazakh
e. Georgian
f. Azerbaidzhan
g. Lithuanian
h. Moldavian
i. Latvian
j. Tadjik
k. Armenian
l. Turkomen
m. Kirgiz
n. Estonian
o. Finno-Ugrian
p. Tatar
q. Buriat-Mongol

In addition, *Source Y* gives the following:

r. Russian and Tatar
s. Russian and native
t. Russian and Bashkir
u. Yakut
v. Russian and Mordvin
w. Russian and Buriat
x. Kabardin and Russian
y. Balkar and Russian

OT: Same as in 2001 for languages and literatures above.
Gen: Universities

*University specialties in this section refer to those *not* classified elsewhere; that is, universities may offer specialties listed elsewhere as well as those listed under this "2000" series, such for example as geology (0102), medicine (1901) and a few other specialties.

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Offerings: Regular—I–1; I–2; I–3; I–4; I–7; I–9; I–10; I–11; I–12; I–13; I–14; I–15; I–16; I–17; I–18; I–20; I–21; I–23; I–28; I–29; I–30; I–31; I–33; I–34; I–35; I–37; I–38; I–39.

2003—Slavic languages and literature (*Slavianskie iazyki i literatura*):

a. Polish
b. Czech
c. Bulgarian
d. Serbian
e. Slovak

OT: (1) Philologist: Slavic literature specialist; (2) philologist: Slavic linguist.
Ind: Moscow University
Offerings: Regular—I–19; I–20; XVIII–208.

2004—Romance and Germanic languages and literature (*Romano-germanskie iazyki i literature*):

a. English
b. German
c. French
d. Spanish
e. Swedish
f. Rumanian
g. Norwegian
h. Danish
i. Italian

OT: Philologist: teacher of a given language.
Gen: Universities
Offerings: Regular—I–2; I–7; I–8; I–10; I–12; I–15; I–18; I–19; I–20; I–21; I–22; I–30; I–31; I–33; I–35; I–38.

2005—Eastern languages and literature (*Vostochnye iazyki i literatura*):

a. Chinese
b. Korean
c. Japanese
d. Mongolian
e. Indian
f. Iranian
g. Turkic
h. Afrikaans
i. Turkish
j. Uigur
k. Arabic
l. Assyrology
m. Semitology
u. Egyptology
o. Irano-Afghan
p. Caucasus studies
q. Malay
r. Manchurian-Evenki studies
s. Vietnamese
t. Tibetan

OT: Orientalist-philologist or Orientalist-researcher
Ind: Institute of Ear Eastern Languages of Moscow University. Length of study is 6 years (*Source Y*).
Offerings: Regular—I–1; I–10; I–19; I–28; I-29; I–31.

(2005a)—Hungarian language and literature (*Vengerskii iazyk i literatura*).
OT: Not available.
Ind: Leningrad State University.
Offerings: Regular—I–19.

(2005b)—Albanian language and literature (*Albanskii iazyk i literatura*).
NOTE.—This specialty is listed in *Sprav VUZ–1958* and *1959*.
OT: Not available.
Ind: Leningrad State University.
Offerings: Regular—I–19.

2006—Classical philology (*Klassicheskaia filologiia*)
a. Greek language and literature.
b. Latin language and literature.
OT: Philologist: teacher of Greek, Latin and Russian language.
Ind: Moscow University.
Offerings: Regular—I–22.

2007—Area studies on foreign countries of the East (*Stranovedenie po stranam zarubezhnogo Vostoka*):

a. Area studies on China
b. Area studies on Korea
c. Area studies on Mongolia
d. Area studies on Japan
e. Area studies on Indonesia
f. Area studies on Turkey
g. Area studies on Arab countries
h. Area studies on Iran
i. Area studies on Afghanistan
j. Area studies on India

OT: Not available.
Gen: Not available.
Offerings: Not listed in *Sprav VUZ–1958* or *1959*.

2008—History (*Istoriia*).
OT: (1) Historian: teacher of history and Constitution of the U.S.S.R.; (2) Historian: researcher in (a) general history; (b) archives; (c) museums; (d) archaeology; and (e) ethnography.
Gen: Universities
Offerings: Regular—I–1; I–2; I–3; I–4; I–5; I–6; I–7; I–8; I–10; I–11; I–12; I–13; I–14; I–15; I–16; I–17; I–18; I–19; I–20; I–21; I–22; I–23; I–24; I–25; I–26; I–27; I–28; I–29; I–30; I–31; I–32; I–33; I–34; I–35; I–36; I–37; I–38; I–39.

2009—Historical-archival science (*Istoriko-arkhivovedenie*).
OT: Historian archival specialist.
Ind: Moscow Historical Archival Institute.
Offerings: Regular—XVIII–207.

2010—Political economy (*Politicheskaia ekonomiia*).
OT: Economist—teacher of political economy for secondary specialized educational establishments.
Gen: Universities. *Source Y* for 1959 reveals that there are 2 general programs, one for 6 years and the other, 5 years.
Offerings: Regular—I–15; I–19; I–22.

2011—Philosophy (*Filosofiia*).
OT: (1) Philosopher: teacher of philosophy and principles of Marxism-Leninism; (2) Philosopher: teacher of philosophy and logic.
Ind: Moscow University. Length of training: 5 years and 4 months (*Source Y*).
Offerings: Regular—I–15; I–19; I–22; I–31.

2012—Psychology (*Psikhologiia*).
OT: (1) Psychologist with specializations: (a) child and pedagogical psychology; (b) industrial psychology; (c) patho-psychology; and (d) defectology; (2) teacher of psychology.
Ind: Moscow University. Length of study is 5 years and 4 months (*Source Y*).
Offerings: Regular—I–15; I–19; I–22; I–31.

2013—Mathematics (*Matematika*).
OT: (1) Mathematician: teacher of mathematics; (2) Research mathematician with various specializations.
Gen: Universities. Training program for teachers 5 years; for research mathematicians 5½ years (*Source Y*).
Offerings: Regular—I–1; I–2; I–3; I–4; I–5; I–6; I–7; I–8; I–9; I–10; I–11; I–12; I–13; I–14; I–15; I–16; I–17; I–18; I–20; I–21; I–22; I–22A; I–23; I–24; I–25; I–26; I–27; I–28; I–29; I–30; I–31; I–32; I–33; I–34; I–35; I–36; I–37; I–38; I–39. Evening—I–25a.

2014—Mechanics (*Mekhanika*).
OT: Researcher in mechanics.
Gen: Universities; length of study 5½ years (*Source Y*).
Offerings: Regular—I–1; I–5; I–6; I–9; I–13; I–15; I–19; I–20; I–22; I–22A; I–26; I–27; I–28; I–31; I–32; I–36; I–37.

2015—Astronomy (*Astronomiia*).
OT: Astronomer.
Ind: Moscow University; length of study 5½ years (*Source Y*).
Offerings: Regular—I–15; I–19; I–22; I–23; I–37.

2016—Physics (*Fizika*).
OT: (1) Physicist: teacher of physics; (2) research physicist with specializations in: theoretical physics, physics of low temperatures, molecular physics, optics and spectroscopy, physics of metal and X-ray technology, magnetic fields, solid state, semiconductors, electro-physics, nuclear physics, radiophysics, electronics, high polymer physics, atmospheric and geophysics.
Gen: Universities; program for teachers 5 years; for research physicists, 5½ years (*Source Y*).
Offerings: Regular—I–1; I–2; I–3; I–4; I–5; I–6; I–7; I–8; I–9; I–10; I–11; I–12; I–13; I–14; I–15; I–16; I–17; I–18; I–19; I–20; I–21; I–22; I–22A; I–23; I–24; I–25; I–26; I–27; I–28; I–29; I–30; I–31; I–32; I–33; I–34; I–35; I–36; I–37; I–38; I–39.

2017—Geophysics (*Geofizika*).
OT: Not available.

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Gen: Not available.
Offerings: Regular—I–19; I–22; I–28.

2018—Chemistry (*Khimiia*).
OT: (1) Chemist: teacher of chemistry; (2) research chemist with specializations in inorganic chemistry, analytical chemistry, organic chemistry, physical chemistry, chemistry of high molecular compounds, and radioactive isotope chemistry.
Gen: Universities. Training of teachers lasts 5 years; of research chemists, 5½ years (*Source Y*).
Offerings: Regular—I–1; I–2; I–3; I–4; I–5; I–6; I–8; I–9; I–10; I–11; I–13; I–14; I–15; I–16; I–17; I–18; I–19; I–20; I–21; I–22; I–22A; I–23; I–24; I–26; I–27; I–28; I–29; I–30; I–31; I–32; I–34; I–36; I–37; I–38.

2019—Biology (*Biologiia*).
OT: (1) Teacher of biology and chemistry; (2) research biologist with specializations in biochemistry, genetics, biophysics, microbiology, hydrobiology, ichthyology, or anthropology; and in addition, Specialties 2020, 2021, 2022 and 2023.
Gen: Universities; joint program for Specialties 2019, 2020, 2021, 2022 and 2023. Training of teachers lasts 5 years; of research biologists, 5½ years (*Source Y*).
Offerings: Regular—I–2; I–7; I–8; I–9; I–10; I–12; I–15; I–20; I–21; I–22A; I–23; I–30; I–33; I–34; I–37; I–38; I–39.

2020—Botany (*Botanika*).
OT: Not available.
Gen: Not available.
Offerings: Regular—I–1; I–3; I–4; I–5; I–6; I–11; I–13; I–14; I–16; I–17; I–18; I–19; I–22; I–24; I–26; I–27; I–28; I–29; I–31; I–32; I–35; I–36. Extension—IV–2.

2021—Zoology (*Zoologiia*).
OT: Not available.
Gen: Not available.
Offerings: Regular—I–1; I–3; I–4; I–5; I–6; I–11; I–13; I–14; I–16; I–17; I–18; I–19; I–22; I–24; I–26; I–27; I–28; I–29; I–31; I–32; I–35; I–36.

2022—Plant physiology (*Fiziologiia rastenii*).
OT: Not available.
Gen: Not available.
Offerings: Regular—I–19; I–22.

2023—Human and animal physiology (*Fiziologiia cheloveka i zhivotnykh*).
OT: Not available.
Gen: Not available.
Offerings: Regular—I–19; I–22.

2024—Anthropology (*Antropologiia*).
OT: Biologist-anthropologist.
Ind: Moscow University. Length of training is 5 years, 4 months (*Source Y*).
Offerings: Regular—I–22.

2025—Physical geography (*Fizicheskaia geografiia*)
OT: Teacher of geography and geographer with specializations: physical geography, economic geography, geomorphology and cartography.
Gen: Universities. Teacher training lasts 5 years, research geographers 5½ years (*Source Y*).
Offerings: Regular—I–2; I–3; I–4; I–10; I–11; I–13; I–14; I–15; I–16; I–18; I–19; I–20; I–22; I–23; I–24; I–26; I–27; I–28; I–30; I–31; I–32; I–33; I–35; I–37; I–38; I–39.

2026—Economic geography (*Ekonomicheskaia geografiia*).
OT: Geographer
Gen: Universities
Offerings: Regular—I–14; I–19; I–22; I–27.

2027—Journalism (*Zhurnalistika*).
OT: Journalist.
Gen: Universities.
Offering: Regular—I–1; I–3; I–4; I–14; I–16; I–19; I–20; I–22; I–28; I–31; I–36. Extension—IV–2.

2028—Literary work (*Literaturnaia rabota*).
OT: Not available.
Ind: Gor'kii Institute of Literature in Moscow.
Offerings: Regular—XV–47; XVIII–206.

2029—History of the arts (*Istoriia iskusstv*).
OT: Not available.
Gen: Not available.
Offerings: Not listed in *Sprav VUZ–1958* or *1959*.

2030—Geography (revised) (*Geografiia*).
OT: Geographer.
Gen: Universities.
Offerings: Not listed in *Sprav VUZ–1958* or *1959*.

SPECIALTY GROUP 21.—*Specialties in Pedagogical and Library Institutes (Spetsial'nosti v pedagogicheskikh i bibliotekhnykh institutakh)*.
(Total in specialty group: 43)

2101—Russian language and literature (*Russkii iazyk i literatura*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–4; XVIII–6; XVIII–21; XVIII–23; XVIII–25; XVIII–42; XVIII–52; XVIII–59; XVIII–62; XVIII–66; XVIII–72; XVIII–88; XVIII–109; XVIII–113; XVIII–123; XVIII–128; XVIII–143; XVIII–156; XVIII–156A; XVIII–157; XVIII–159; XVIII–160; XVIII–171; XVIII–175; XVIII–176; XVIII–186. Extension—XVIII–2; XVIII–3; XVIII–4.

(2101a)—Russian language, literature and singing (*Russkii iazyk, literatura i penie*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–26; XVIII–40; XVIII–41; XVIII–53; XVIII–58; XVIII–65; XVIII–110; XVIII–112; XVIII–116; XVIII–127; XVIII–174.

2102—Native language and literature of peoples of the U.S.S.R. (*Rodnoi iazyk i literatura narodov SSSR*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–21; XVIII–25; XVIII–186. Extension—XVIII–2; XVIII–3.

(2102a)—Native language, literature, and singing (*Rodnoi iazyk, literatura i penie*)
NOTE.—This combination specialty is listed in *Sprav VUZ–1958* and *1959*.
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–41; XVIII–80; XVIII–93; XVIII–110; XVIII–116; XVIII–132; XVIII–148; XVIII–174.

(2102b)—Native language, literature, and boarding school supervisor (*Rodnoi iazyk, literatura i vospitatel' shkoly-internata*)
NOTE.—This combination specialty is listed in *Sprav VUZ–1958* and *1959*.
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–65.

2103—Foreign languages (*Inostrannye iazyki*):
a. English. b. French. c. German.
OT: Teacher of English, German or French.
Gen and *Ind:* Moscow Pedagogical Institute of Foreign Languages. Length of study in the latter is 5 years (*Source Y*).
Offerings: Regular—I–16; XVIII–9; XVIII–12; XVIII–15; XVIII–19; XVIII–25; XVIII–29; XVIII–30; XVIII–48; XVIII–52; XVIII–57; XVIII–59; XVIII–66; XVIII–69; XVIII–76; XVIII–77; XVIII–81; XVIII–84; XVIII–88; XVIII–90; XVIII–105; XVIII–115; XVIII–117; XVIII–119; XVIII–120; XVIII–123; XVIII–130; XVIII–133; XVIII–135; XVIII–136; XVIII–137; XVIII–141; XVIII–143; XVIII–144; XVIII–162; XVIII–164; XVIII–165; XVIII–172; XVIII–176; XVIII–183; XVIII–190; XVIII–193; XVIII–195; XVIII–196; XVIII–197; XVIII–198; XVIII–200; XVIII–201.

(2103b)—Romance and Germanic languages and literature and boarding school supervisor (*Romano-germanskie iazyki i literatura i vospitatel' shkoly-internata*)
NOTE.—This combination specialty is listed in *Sprav VUZ–1958* and *1959*.
OT: Not available.

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Gen: Not available.
Offerings: Regular—XVIII–196.

2104—Mathematics (*Matematika*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–25.

2105—Physics (*Fizika*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–156A.

2106—Natural sciences and chemistry (*Estestvoznanie i khimiia*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–208. Extension—XVIII–2.

2107—Geography (*Geografiia*).
OT: Not available.
Gen: Not available.
Offerings: Regular—I–1; XVIII–104; XVIII–156A. Extension—XVIII–2; XVIII–3; XVIII–4.

2108—History (*Istoriia*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–208. Extension—XVIII–2; XVIII–3; XVIII–4.

2109—Drafting and drawing (*Cherchenie i risovanie*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–104; XVIII–156. Extension—XVIII–4.

2110—Pedagogy and psychology (*Pedagogiia i psikholigiia*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–35; XVIII–45; XVIII–50; XVIII–65; XVIII–90; XVIII–105; XVIII–133; XVIII–143; XVIII;156; XVIII–156A; XVIII–168. Extension—XVIII–4.

2111—Defectology (*Defektologiia*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–65. Extension—XVIII–4. Jointly with Russian language and literature (2101): XVIII–90; XVIII–105. Jointly with mathematics (2104): XVIII–90; XVIII–105.

2112—Cultural-educational work (*Kul'turno-prosvetitel'naia rabota*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–203; XVIII–204; XVIII–205.

2113—Library science and bibliography (*Bibliotekovedenie i bibliografiia*).
OT: Not available.
Gen: Not available.
Offerings: Regular—I–1; I–4; XVIII–53; XVIII–101; XVIII–157; XVIII–203; XVIII–204; XVIII–205. Extension—XVIII–2.

2114—Physical education (*Fizicheskoe vospitanie*).
OT: Not available.
Gen: Not available.
Offerings: Not listed in *Sprav VUZ–1958* or *1959*.

(2115)*—Native language and literature (*Rodnoi iazyk i literatura*).

(2116)*—Physics and mathematics (*Fizika i matematika*).

(2117)*—History (*Istoriia*).

(2118)*—Natural science and geography (*Estestvoznanie i geografiia*).

GENERAL NOTE TO 21PP, 21PQ, 21PR.—In addition to the combination of specialties in teacher training listed below in 21XX–21ZZ, the following joint specializations were found in *Sprav VUZ–1958* and *1959:*

21PP—Native language, literature and history (*Rodnoi iazyk, literatura i istoriia*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–3; XVIII–6; XVIII–13; XVIII–23; XVIII–34; XVIII–37; XVIII–45; XVIII–53A; XVIII–56; XVIII–59; XVIII–62; XVIII–66; XVIII–70; XVIII–72; XVIII–82; XVIII–86; XVIII–88; XVIII–89; XVIII–94; XVIII–95; XVIII–98; XVIII–101; XVIII–103; XVIII–109; XVIII–127; XVIII–143; XVIII–145; XVIII–146; XVIII–151; XVIII–156; XVIII–156A; XVIII–158; XVIII–159; XVIII–168; XVIII–171; XVIII–175; XVIII–191; XVIII–194.

21PQ—Russian language and literature and native language and literature (*Russkii iazyk i literatura i rodnoi iazyk i literatura*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–1; XVIII–2; XVIII–15; XVIII–22; XVIII–31; XVIII–33; XVIII–38; XVIII–39; XVIII–42; XVIII–53; XVIII–53A; XVIII–58; XVIII–60; XVIII–64; XVIII–66; XVIII–70; XVIII–71; XVIII–87; XVIII–97; XVIII–125; XVIII–130; XVIII–138; XVIII–139; XVIII–142; XVIII–145; XVIII–149; XVIII–151; XVIII–156; XVIII–157; XVIII–161; XVIII–162; XVIII–168; XVIII–181; XVIII–182; XVIII–184.

21PR—Native language and literature, and foreign language (*Rodnoi iazyk i literatura i inostrannyi iazyk*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–4; XVIII–15; XVIII–26; XVIII–46; XVIII–47; XVIII–53A; XVIII–68; XVIII–70; XVIII–86; XVIII–97; XVIII–150; XVIII–151; XVIII–165; XVIII–179; XVIII–197; XVIII–199; XVIII–200.

21PS—Native language, literature and singing (*Rodnoi iazyk, literatura i penie*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–15.

21PT—Biology and chemistry (*Biologiia i khimiia*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–22; XVIII–29; XVIII–52; XVIII–75; XVIII–111.

21PU—Correction of speech defects and Lithuanian language (*Logopediia i litovskii iazyk*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–25.

21PV—Physical education and foreign language (*Fizicheskoe vospitanie i inostrannyi iazyk*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–25.

21PW—Physics and chemistry (*Fizika i khimiia*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–30; XVIII–69; XVIII–83; XVIII–84; XVIII–141; XVIII–142; XVIII–178.

21PX—Drafting, drawing and manual training (*Cherchenie, risovanie i trud*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–76; XVIII–77; XVIII–83; XVIII–111; XVIII–172.

21PY—Chemistry and fundamentals of production (*Khimiia i osnovy proizvodstva*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–90.

21PZ—Foreign language and instructor for boarding school (*Inostrannyi iazyk i vospitatel' shkoly–internata*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XVIII–194; XVIII–196.

21QQ—Methodology of elementary school instruction (*Metodika nachal'nogo obrazovaniia*).

* At teachers' institutes (*uchitel'skie instituty*). According to official Soviet sources (*Sprav VUZ–1958* and *1959*), however, all these have been closed or converted to pedagogical institutes (*pedagogicheskie instituty*). Therefore Specialties 2115, 2116, 2117 and 2118 have been discontinued.

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OT: Not available.
Gen: Pedagogical institutes. Program of study and decimal code not known. Specialty listed in *Sprav VUZ–1958* and *1959*.
Offerings: Regular–XVIII–3; XVIII–6; XVIII–8; XVIII–13; XVIII–16; XVIII–16A; XVIII–23; XVIII–26; XVIII–27; XVIII–30; XVIII–31; XVIII–32; XVIII–33; XVIII–34; XVIII–49; XVIII–50; XVIII–51; XVIII–55; XVIII–57; XVIII–57A; XVIII–70; XVIII–72; XVIII–82; XVIII–83; XVIII–86; XVIII–90; XVIII–91; XVIII–94; XVIII–97; XVIII–99; XVIII–101; XVIII–103; XVIII–104; XVIII–109; XVIII–120; XVIII–125; XVIII–132; XVIII–137; XVIII–139; XVIII–140; XVIII–143; XVIII–145; XVIII–148; XVIII–151; XVIII–152; XVIII–153; XVIII–156; XVIII–156A; XVIII–157; XVIII–158; XVIII–168; XVIII–169; XVIII–175; XVIII–176; XVIII–177; XVIII–180; XVIII–186; XVIII–188.

GENERAL NOTE TO 21XX–21ZZ.–In 1957 the specialties offered in pedagogical institutes were consolidated in such a way that teachers trained through these programs could teach combinations of two subjects. These new specialties were revealed and their curricula presented in: Ministerstvo Vysshego Obrazovaniia SSSR, *Uchebnye plany pedagogicheskikh institutov* (Study Plans of Pedagogical Institutes), Moscow, 1957. The revised decimal classification code for the new specialties was not available.

21XX–Russian language, literature and history (*Russkii iazyk, literatura i istoriia*)
OT: Teacher of . . . (this specialty)
Gen: Pedagogical institutes
Offerings: Regular–XVIII–1; XVIII–8; XVIII–9; XVIII–12; XVIII–18; XVIII–19; XVIII–20; XVIII–22; XVIII–24; XVIII–29; XVIII–30; XVIII–35; XVIII–36; XVIII–37; XVIII–44; XVIII–48; XVIII–50; XVIII–51; XVIII–52; XVIII–53A; XVIII–54; XVIII–56; XVIII–57; XVIII–57A; XVIII–58; XVIII–63; XVIII–69; XVIII–71; XVIII–73; XVIII–74; XVIII–75; XVIII–76; XVIII–77; XVIII–80; XVIII–81; XVIII–82; XVIII–83; XVIII–84; XVIII–85; XVIII–86; XVIII–87; XVIII–90; XVIII–92; XVIII–93; XVIII–94; XVIII–95; XVIII–97; XVIII–101; XVIII–102; XVIII–103; XVIII–104; XVIII–105; XVIII–107; XVIII–108; XVIII–115; XVIII–119; XVIII–120; XVIII–124; XVIII–126; XVIII–129; XVIII–132; XVIII–135; XVIII–137; XVIII–139; XVIII–141; XVIII–142; XVIII–144; XVIII–145; XVIII–146; XVIII–148; XVIII–149; XVIII–151; XVIII–158; XVIII–163; XVIII–164; XVIII–165; XVIII–166; XVIII–168; XVIII–169; XVIII–172; XVIII–178; XVIII–181; XVIII–182; XVIII–183; XVIII–184; XVIII–187; XVIII–188; XVIII–189; XVIII–190.

21XY–Russian language, literature and foreign language (*Russkii iazyk, literatura i inostrannyi iazyk*)
OT: Teacher of . . . (this specialty)
Gen: Pedagogical institutes
Offerings: Regular–XVIII–2; XVIII–7; XVIII–10; XVIII–11; XVIII–13; XVIII–14; XVIII–15; XVIII–17; XVIII–26; XVIII–28; XVIII–31; XVIII–40; XVIII–42; XVIII–43; XVIII–46; XVIII–47; XVIII–53A; XVIII–55; XVIII–61; XVIII–68; XVIII–71; XVIII–86; XVIII–90; XVIII–96; XVIII–98; XVIII–99; XVIII–106; XVIII–111; XVIII–114; XVIII–118; XVIII–121; XVIII–123; XVIII–125; XVIII–128; XVIII–133; XVIII–136; XVIII–138; XVIII–147; XVIII–150; XVIII–152; XVIII–154; XVIII–155; XVIII–161; XVIII–170; XVIII–176; XVIII–177; XVIII–179; XVIII–181; XVIII–185; XVIII–197.
NOTE.–This new specialty is a combination of specialties 2101 and 2103.*

21XZ–Foreign language (*Inostrannyi iazyk*)
NOTE.–This new specialty is a counterpart of former specialty 2103; however, it refers to programs of training in two foreign languages (instead of one as was the case in former programs).
OT: Teacher of . . . (this specialty)
Gen: Pedagogical institutes
Offerings: Not listed in *Sprav VUZ–1958* or *1959*

21YX–Mathematics and drafting (*Matematika i cherchenie*)
OT: Teacher of . . . (this specialty)
Gen: Pedagogical institutes
Offerings: Regular–XVIII–12; XVIII–16; XVIII–16A; XVIII–22; XVIII–23; XVIII–25; XVIII–29; XVIII–30; XVIII–35; XVIII–41; XVIII–45; XVIII–47; XVIII–48; XVIII–50; XVIII–53A; XVIII–57; XVIII–59; XVIII–61; XVIII–63; XVIII–65; XVIII–68; XVIII–73; XVIII–76; XVIII–77; XVIII–78; XVIII–79; XVIII–80; XVIII–81; XVIII–83; XVIII–84; XVIII–88; XVIII–89; XVIII–90; XVIII–93; XVIII–95; XVIII–101; XVIII–104; XVIII–105; XVIII–106; XVIII–115; XVIII–116; XVIII–117; XVIII–119; XVIII–120; XVIII–125; XVIII–133; XVIII–135; XVIII–136; XVIII–137; XVIII–138; XVIII–141; XVIII–142; XVIII–144; XVIII–146; XVIII–154; XVIII–156; XVIII–162; VXIII–163; XVIII–164; XVIII–165; XVIII–166; XVIII–167; XVIII–168; XVIII–171; XVIII–172; XVIII–174; XVIII–178; XVIII–184; XVIII–186; XVIII–190.
NOTE.–This new specialty is a combination of former specialties 2104 and 2109.

21YY–Mathematics and physics (*Matematika i fizika*)
NOTE.–This new specialty is a combination of former specialties 2104 and 2105.
OT: Teacher of . . . (this specialty)
Gen: Pedagogical institutes.
Offerings: Regular–XVIII–1; XVIII–2; XVIII–3; XVIII–6; XVIII–7; XVIII–8; XVIII–9; XVIII–10; XVIII–11; XVIII–13; XVIII–14; XVIII–15; XVIII–17; XVIII–18; XVIII–19; XVIII–20; XVIII–21; XVIII–24; XVIII–26; XVIII–27; XVIII–28; XVIII–31; XVIII–33; XVIII–34; XVIII–36; XVIII–37; XVIII–38; XVIII–39; XVIII–40; XVIII–41; XVIII–42; XVIII–44; XVIII–46; XVIII–51; XVIII–53; XVIII–54; XVIII–55; XVIII–56; XVIII–57A; XVIII–58; XVIII–60; XVIII–62; XVIII–64; XVIII–66; XVIII–67; XVIII–70; XVIII–71; XVIII–74; XVIII–75; XVIII–82; XVIII–85; XVIII–86; XVIII–87; XVIII–88; XVIII–92; XVIII–94; XVIII–96; XVIII–97; XVIII–99; XVIII;103; XVIII–107; XVIII–109; XVIII–110; XVIII–111; XVIII–112; XVIII–113; XVIII–114; XVIII–118; XVIII–121; XVIII–123; XVIII–124; XVIII–126; XVIII–127; XVIII–128; XVIII–129; XVIII–132; XVIII–139; XVIII–140; XVIII–143; XVIII–145; XVIII–147; XVIII–148; XVIII–149; XVIII–150; XVIII–151; XVIII–152; XVIII–155; XVIII–156; XVIII–156A; XVIII–157; XVIII–158; XVIII–159; XVIII–160; XVIII–161; XVIII–169; XVIII–170; XVIII–174; XVIII–175; XVIII–176; XVIII–177; XVIII–179; XVIII–180; XVIII–181; XVIII–182; XVIII–183; XVIII–185; XVIII–187; XVIII–188; XVIII–189; XVIII–208.
Extension–XVIII–2; XVIII–4.

21YZ–Physics and fundamentals of production (*Fizika i osnovy proizvodstva*).
NOTE.–This new specialty is a combination of former specialty 2105 and the newly introduced polytechnical instruction subject, fundamentals of production.
OT: Teacher of . . . (this specialty).
Gen: Pedagogical institutes.
Offerings: Regular–XVIII–3; XVIII–12; XVIII–15; XVIII–16; XVIII–16A; XVIII–21; XVIII–22; XVIII–23; XVIII–25; XVIII–26; XVIII–27; XVIII–29; XVIII–30; XVIII–33; XVIII–34; XVIII–35; XVIII–37; XVIII–41; XVIII–43; XVIII–45; XVIII–46; XVIII–47; XVIII–48; XVIII–50; XVIII–52; XVIII–53A; XVIII–56; XVIII–57; XVIII–58; XVIII–59; XVIII–61; XVIII–63; XVIII–65; XVIII–66; XVIII–68; XVIII–69; XVIII–70; XVIII–73; XVIII–76; XVIII–77; XVIII–78; XVIII–79; XVIII–80; XVIII–81; XVIII–83; XVIII–84; XVIII–86; XVIII–88; XVIII–90; XVIII–93; XVIII–95; XVIII–101; XVIII–104; XVIII–105; XVIII–106; XVIII–108; XVIII–115; XVIII–116; XVIII–117; XVIII–119; XVIII–120; XVIII–123; XVIII–125; XVIII–127; XVIII–128; XVIII–133; XVIII–135; XVIII–137; XVIII–138; XVIII–139; XVIII–141; XVIII–143; XVIII–144; XVIII–146; XVIII–154; XVIII–155; XVIII–156; XVIII–157; XVIII–162; XVIII–163; XVIII–164; XVIII–165; XVIII–166; XVIII–167;

* Despite the consolidation, some institutions continue to offer the original specialties.

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XVIII–168; XVIII–169; XVIII–170; XVIII–171; XVIII–172; XVIII–174; XVIII–176; XVIII–178; XVIII–179; XVIII–182; XVIII–184; XVIII–186; XVIII–190.

21ZX—Biology, chemistry and fundamentals of agriculture (*Biologiia, khimiia i osnovy sel'skogo khoziaistva*).

NOTE.—This new specialty is a combination of former specialty 2106 and the newly introduced polytechnical instruction subject, fundamentals of agriculture.

OT: Teacher of . . . (this specialty).

Gen: Pedagogical institutes.

Offerings: Regular—XVIII–3; XVIII–6; XVIII–13; XVIII–23; XVIII–25; XVIII–27; XVIII–33; XVIII–34; XVIII–40; XVIII–45; XVIII–53; XVIII–53A; XVIII– 55; XVIII–58; XVIII–59; XVIII–64; XVIII–66; XVIII–67; XVIII–71; XVIII–76; XVIII–77; XVIII–78; XVIII–79; XVIII–80; XVIII–81; XVIII–86; XVIII–90; XVIII–93; XVIII–97; XVIII–98; XVIII–100; XVIII–102; XVIII–104; XVIII–105; XVIII–106; XVIII–110; XVIII–114; XVIII–117; XVIII–118; XVIII–120; XVIII–123; XVIII–127; XVIII–129; XVIII–133; XVIII–135; XVIII–136; XVIII–138; XVIII–139; XVIII–143; XVIII–144; XVIII–150; XVIII–155; XVIII–156; XVIII–157; XVIII–159; XVIII–160; XVIII–162; XVIII–164; XVIII–165; XVIII–166; XVIII–167; XVIII–168; XVIII–169; XVIII–171; XVIII–172; XVIII–174; XVIII–176; XVIII–179; XVIII–184.

21ZY—Geography and biology (*Geografiia i biologiia*).

NOTE.—This new specialty is a combination of former specialties 2107 and 2106 (the latter, however, has been upgraded to a more rigorous program with courses similar to those offered in the program of specialty 2019).

OT: Teacher of . . . (this specialty).

Gen: Pedagogical institute.

Offerings: Regular—XVIII–3; XVIII–9; XVIII–13; XVIII–19; XVIII–21; XVIII–25; XVIII–29; XVIII–30; XVIII–34; XVIII–35; XVIII–36; XVIII–45; XVIII–52; XVIII–53; XVIII–53A; XVIII–57; XVIII–59; XVIII–69; XVIII–77; XVIII–80; XVIII–86; XVIII–88; XVIII–90; XVIII–93; XVIII–101; XVIII–103; XVIII–106; XVIII–115; XVIII–119; XVIII–124; XVIII–126; XVIII–137; XVIII–141; XVIII–142; XVIII–143; XVIII–144; XVIII–145; XVIII–147; XVIII–151; XVIII–154; XVIII–155; XVIII–156; XVIII–156; XVIII–157; XVIII–160; XVIII–168; XVIII–171; XVIII–172; XVIII–177; XVIII–178; XVIII–183; XVIII–189; XVIII–190.

21ZZ—Physical education (*Fizicheskoe vospitanie*).

NOTE..—This is a new specialty established in pedagogical institutes and is a modified version of specialty 1906 (offered in institutes of physical culture and sports).

OT: Teacher of . . . (this specialty).

Gen: Pedagogical institutes.

Offerings: Regular—I–30; I–33; XVIII–9; XVIII–19; XVIII–25; XVIII–26; XVIII–30; XVIII–33; XVIII–35; XVIII–40; XVIII–41; XVIII–48; XVIII–52; XVIII–56; XVIII–59; XVIII–61; XVIII–62; XVIII–68; XVIII–69; XVIII–70; XVIII–76; XVIII–77; XVIII–80; XVIII–83; XVIII–90; XVIII–93; XVIII–106; XVIII–112; XVIII–116; XVIII–124; XVIII–125; XVIII–133; XVIII–136; XVIII–138; XVIII–142; XVIII–143; XVIII–154; XVIII–156; XVIII–162; XVIII–165; XVIII–171; XVIII–172; XVIII–173; XVIII–178; XVIII–179; XVIII–181.

SPECIALTY GROUP 22.—*Arts (Iskusstvo)*
(Total in specialty group: 31.)

2201—Piano (Organ) (*Fortepiano [organ]*).

OT: Not available.

Gen: Not available.

Offerings: Regular —XV–13; XV–14; XV–15; XV–16; XV–17; XV–18; XV–19; XV–20; XV–21; XV–22; XV–23; XV–24; XV–25; XV–26; XV–27; XV–28; XV–29; XV–30; XV–31; XV–32; XV–33; XV–34.

2202—Orchestral instruments (*Orkestrovye instrumenty*).

OT: Not available.

Gen: Not available.

Offerings: Regular—XV–13; XV–14; XV–15; XV–16; XV–17; XV–18; XV–19; XV–20; XV–21; XV–22; XV–23; XV–24; XV–25; XV–26; XV–27; XV–28; XV–29; XV–30; XV–31; XV–32; XV–33; XV–34.

2203—Folk instruments (*Narodnye instrumenty*)

OT: Not available.

Gen: Not available.

Offerings: Regular—XV–13; XV–14; XV–15; XV–16; XV–18; XV–19; XV–22; XV–23; XV–25; XV–27; XV–28; XV–29; XV–31; XV–33; XV–34.

2204—Singing (*Penie*).

OT: Not available.

Gen: Not available.

Offerings: Regular—XV–13; XV–14; XV–15; XV–16; XV–17; XV–18; XV–19; XV–20; XV–21; XV–22; XV–23; XV–24; XV–25; XV–26; XV–27; XV–28; XV–29; XV–30; XV–31; XV–32; XV–33; XV–34.

2205—Opera-symphonic conducting (*Operno-simfonicheskoe dirizhirovanie*).

OT: Not available.

Gen: Not available.

Offerings: Regular—XV–22; XV–24; XV–26; XV–33.

2206—Choral direction (*Khorovoe dirizhirovanie*).

OT: Not available.

Gen: Not available.

Offerings: Regular—XV–13; XV–14; XV–15; XV–16; XV–17; XV–18; XV–19; XV–20; XV–21; XV–22; XV–23; XV–24; XV–25; XV–26; XV–27; XV–28; XV–29; XV–30; XV–31; XV–32; XV–33; XV–34.

2207—Composition (*Kompozitsiia*).

OT: Not available.

Gen: Not available.

Offerings: Regular—XV–13; XV–14; XV–15; XV–16; XV–17; XV–18; XV–19; XV–20; XV–21; XV–22; XV–23; XV–24; XV–27; XV–30; XV–31; XV–32; XV–33; XV–34.

2208—Musicology (*Muzykovedenie*).

OT: Not available.

Gen: Not available.

Offerings: Regular—XV–13; XV–14; XV–15; XV–16; XV–17; XV–18; XV–20; XV–21; XV–22; XV–23; XV–24; XV–25; XV–26; XV–27; XV–28; XV–29; XV–30; XV–31; XV–32; XV–33; XV–34.

2209—Dramatic theatre and cinema acting (*Akter dramaticheskogo teatra i kino*).

OT: Not available.

Gen: Not available.

Offerings: Regular—XV–13; XV–16; XV–18; XV–23; XV–30; XV–35; XV–36; XV–37; XV–38; XV–39; XV–40; XV–41; XV–42; XV–43; XV–44; XV–45; XV–46; XV–47.

2210—Musical comedy acting (*Akter muzykal'noi komedii*).

OT: Not available.

Gen: Not available.

Offerings: Regular—XV–24; XV–33; XV–37.

2211—Drama production, staging and directing (*Rezhissura dramy*).

OT: Not available.

Gen: Not available.

Offerings: Regular—XV–36; XV–37; XV–38; XV–39; XV–40; XV–41; XV–42; XV–45.

2212—Musical theatre production, staging and directing (*Rezhissura muzykal'nogo teatra*)

OT: Not available.

Gen: Not available.

Offerings: Not listed in *Sprav VUZ–1958* or *1959*.

2213—Ballet production, staging and directing (*Rezhissura baleta*).

OT: Not available.

Gen: Not available.

Offerings: Regular—XV–37.

2214—Cinema production, staging and directing (*Kinorezhissura*).

OT: Not available.

Gen: Not available.

Offerings: Regular—XV–47.

2215—Cinema operation techniques (*Kinooperatorstvo*).

OT: Not available.

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Gen: Not available.
Offerings: Regular—XV–47.

2216—Theatrical techniques (staging effects) and stage-setting of plays (*Teatral'naia tekhnika i oformlenie spektaklia*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XV–41; XV–46.

2217—History and development of theatre arts (*Teatrovedenie*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XV–37; XV–39; XV–40; XV–41; XV–42.

2218—History and development of cinema arts (*Kinovedenie*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XV–47.

2119—Painting (*Zhivopis'*)
OT: Not available.
Gen: Not available.
Offerings: Regular—XV–2; XV–3; XV–4; XV–5; XV–6; XV–7; XV–8; XV–9; XV–10; XV–11; XV–12; XV–36; XV–39; XV–42; XV–47.

2220—Graphics (*Grafika*).
OT: Not available.
Gen: Not available.
Offerings: Regular—IV–27; XV–4; XV–5; XV–6; XV–7; XV–8; XV–10; XV–11; XV–12; XV–36; XV–39; XV–42; XV–47.

2221—Sculpture (*Skul'ptura*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XV–2; XV–3; XV–4; XV–5; XV–6; XV–7; XV–8; XV–9; XV–10; XV–11; XV–12; XV–36; XV–39; XV–42.

2222—Art and decorative metal-working (*Khudozhestvennaia obrabotka metalla*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XV–2; XV–3; XV–5.

2223—Art and decorative wood-working (*Khudozhestvennaia obrabotka dereva*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XV–2; XV–3; XV–5; XV–9.

2224—Art and decorative glass and plastics working (*Khudozhestvennaia obrabotka stekla i plastmass*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XV–2; XV–3; XV–5.

2225—Discontinued, used to be modeling and design of footwear.

2226—Art and decorative ceramics (*Khudozhestvennaia keramika*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XV–2; XV–3; XV–4; XV–5; XV–6; XV–9; XV–11.

2227—Art design and fashioning of fabrics and fabric products (*Khudozhestvennoe oformlenie tkanei i izdelii iz nikh*).
OT: Not available.
Gen: Not available.
Offerings: Regular—VIII–6; XV–3; XV–4; XV–5; XV–9.

2228—History and theory of figurative art (*Istoriia i teoriia izobrazitel'nogo iskusstva*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XV–7.

22XX—Art design and fashioning of leather (*Khudozhestvennaia obrabotka kozhi*).
OT: Not available.
Ind: Tallin Art Institute.
Offerings: Regular—XV–5.

22XY—National art and drama (*Natsional'nye studii*)
OT: Not available.
Gen: Play art institutes.
Offerings: XV–37; XV–41; XV–42; XV–43; XV–44; XV–46.

22XZ—Musical education (*Muzykal'noe vospitanie*).
OT: Not available.
Gen: Not available.
Offerings: Regular—XV–22; XV–25; XV–28.

APPENDIX IV–B–2.—*Divisions of Instruction* (Fakul'tety) *of Soviet Higher Educational Establishments*

Introductory Note

Fakul'tet—the Russian word for a division of instruction in Soviet universities and institutes of higher education is often translated into English as "department." In the functional sense the Soviet *fakul'tet* is similar to "schools" in American universities (which commonly exist on the graduate level and less commonly on the undergraduate level). It is translated throughout this volume as *division*. The reader is reminded that the Russian word *fakul'tet* does *not* have the meaning of "faculty" (in the sense of a teaching staff), as it may be easily but mistakenly understood.

This appendix has been compiled from two Soviet official directories of higher educational establishments, *Sprav VUZ–1958* and *Sprav VUZ–1959*. A further check was made of the Soviet daily press[1] but this failed to disclose any additional information concerning divisions of instruction in civilian higher educational establishments. The data in this appendix are officially as of January 1959 (i.e., the date of the data in the last *Sprav VUZ–1959*), but actually the terminal processing of supplemental material is as of August 1, 1959, and therefore the various types of divisions existing in Soviet higher educational establishments are presented as of that date.

Although the divisions are grouped under the

[1] This processing consisted of a review of announcements concerning admissions to higher educational establishments and about competitions for job appointments. Close to one thousand items were processed.

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institutions in which they most frequently appear, it should be noted that these divisions may exist in other types of educational establishments as well (i.e., radiophysics or mathematics-mechanics divisions of universities may exist in specialized higher educational institutes; and, vice versa, sometimes various engineering divisions appear in universities). For details on the structure of individual higher educational establishments, see the comprehensive institutional directory in Appendix IV–B–3, which lists the instruction divisions in all the civilian higher educatonal establishments of the U.S.S.R. with training specialties under each division in a given institution. The divisions are listed in alphabetical order. Each division, furthermore, has been assigned a roman numeral and letter code, which is also used in the comprehensive institutional directory.

A summary tabulation of the number of *types* of division by institutions is as follows:

I. Universities, total divisions		35
A. Mathematics and natural science divisions	21	
B. Humanities and social science divisions	14	
Engineering Higher Educational Establishments, Total Divisions (II–XI) Total		159
II. Polytechnical and industrial institutes	57	
III. Institutes of power and electrical engineering, radio engineering, and engineering-physics	13	
IV. Institutes of machine building, shipbuilding, aviation engineering, printing-publishing and cinema engineering	30	
V. Geological, mining, petroleum, peat and metallurgical institutes	10	
VI. Institutes of chemical technology	9	
VII. Food technology and fish industry institutes	7	
VIII. Institutes of light industry	2	
IX. Construction, geodesy, and road building institutes	14	
X. Institutes of hydro-meteorology	2	
XI. Transport and communication institutes	15	
XII. Agricultural and forestry institutes		4
XIII. Engineering-economics (management) institutes		21
XIV. Medical, health and physical culture institutes		•5
XV. Pedagogical and art institutes		•a few

DIVISIONS OF SOVIET HIGHER EDUCATIONAL ESTABLISHMENTS BY TYPE OF INSTITUTION, WITH CLASSIFICATION CODE

I. UNIVERSITIES

A. *Mathematics and Natural Sciences Divisions*

Ia. Agricultural (*Sel'skokhoziaistvennyi*)
Ib. Biology (*Biologicheskii*)
Ic. Soil-Biology (*Biologo-pochvennyi*)
Icx. Biology-geography (*Biologo-geograficheskii*)
Id. Chemistry (*Khimicheskii*)
Ie. Engineering construction (*Inzhenerno-stroitel'nyi*)
If. Engineering technical (*Inzhenerno-tekhnicheskii; tekhnicheskii*)
Ig. Forestry engineering (*Lesoinzhenernyi*)
Ih. Geography (*Geograficheskii*)
Ii. Geology (*Geologicheskii*)
Ij. Geology-geography (*Geologo-geograficheskii*)
Irr. Mathematics (*Matematicheskii*)
Irs. Physics-technical (*Fiziko-tekhnicheskii*)
Irt. Radiophysics (*Radiofizicheskii*)
Il. Mechanics (*Mekhanicheskii*)
Im. Mechanics-mathematics (*Mekhaniko-matematicheskii*)
In. Medical (*Meditsinskii*)
Io. Natural sciences (general) (*Fakul'tet estestvennykh nauk*)
Ip. Natural sciences—mathematics (*Estestvenno-matematicheskii*)
Iq. Physics (*Fizicheskii*)
Ir. Physics-mathematics (*Fiziko-matematicheskii*)

B. *Humanities and Social Science Divisions*

Is. Economics (*Ekonomicheskii*)
It. Economics-jurisprudence (*Ekonomiko-iuridicheskii*)
Iu. Foreign languages (*Fakul'tet inostrannykh iazykov*)
Iv. Foreign languages and literature (*Fakul'tet inostrannykh iazykov i literatury*)
Iw. History (*Istoricheskii*)
Ix. History-jurisprudence (*Istoriko-iuridicheskii*)
Iy. History-philology (*Istoriko-filologicheskii*)
Ik. Humanities (*Gumanitarnyi*)
Iz. Journalism (*Fakul'tet zhurnalistiki*)
Iaa. Jurisprudence (*Iuridicheskii*)
Ibb. Oriental studies (*Vostochnyi*)
Icc. Philology (*Filologicheskii*)
Idd. Philosophy (*Filosofskii*)
Iee. Philosophy-history (*Istoriko-filosofskii*)

II. POLYTECHNICAL AND INDUSTRIAL INSTITUTES (and corresponding divisions in all other engineering higher educational establishments)

IIa. Agricultural machinery and tractor construction (*Fakul'tet sel'skokhoziaistvennogo i traktornogo mashinostroeniia*)
IIb. Automechanical (*Avtomekhanicheskii*)
IIc. Automotive and tractor (*Avtotraktornyi*)
IId. Chemical and silicate technology (*Khimiko-tekhnologicheskii i silikatnyi*)
IIe. Chemical machine building (*Fakul'tet khimicheskogo mashinostroeniia*)
IIf. Chemico-technological (*Khimiko-tekhnologicheskii*)
IIfx. Chemistry (*Khimicheskii*)
IIg. Construction materials (*Fakul'tet stroitel'nykh materialov*)
IIh. Construction (*Stroitel'nyi*)
IIhx. Construction and power engineering (*Stroitel'no-energeticheskii*)
IIi. Electric machinery construction (*Elektro-mashinostroitel'nyi*)
IIj. Electric power (*Elektroenergeticheskii*)
IIk. Electromechanical (*Elektromekhanicheskii*)
IIl. Electrophysics (*Elektrofizicheskii*)
IIm. Electrotechnical (*Elektrotekhnicheskii*)
IIn. Engineering construction (*Inzhenerno-stroitel'nyi*)
IIo. Engineering economics (*Inzhenerno-ekonomicheskii*)
IIp. Engineering physics (*Inzhenerno-fizicheskii*)
IIq. Forestry engineering (*Lesoinzhenernyi*)
IIr. Geologic prospecting (*Geologorazvedochnyi*)
IIs. Heat engineering (*Teplotekhnicheskii*)
IIt. Heat power (*Teploenergeticheskii*)
IIu. Hydromelioration (*Gidromeliorativnyi*)
IIv. Hydrotechnical or hydrotechnical construction (*Gidrotekhnicheskii; fakul'tet gidrotekhnicheskogo stroitel'stva*)

•The official directories do not list the divisions of higher education institutions in groups XIV and XV. See further comment in this appendix below.

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IIvx. Instrument construction (*Fakul'tet priborostroeniia*)
IIw. Light industry (*Fakul'tet legkoi promyshlennosti*)
IIx. Machine construction (*Mashinostroitel'nyi*)
IIy. Mechanical engineering and machine building (*Mekhaniko-mashinostroitel'nyi*)
IIz. Mechanical (*Mekhanicheskii*)
IIaa. Mechanico-technological (*Mekhaniko-tekhnologicheskii*)
IIbb. Metallurgical (*Metallurgicheskii*)
IIcc. Metallurgy of ferrous metals (*Fakul'tet metallurgii chernykh metallov*)
IIdd. Metallurgy of nonferrous metals (*Fakul'tet metallurgii tsvetnykh metallov*)
IIee. Mining (*Gornyi*)
IIff. Mining-chemical (*Gornokhimicheskii*)
IIgg. Mining-geological (*Gornogeologicheskii*)
IIhh. Mining-mechanical (*Gornomekhanicheskii*)
IIii. Mining and surveying (*Shachtostroitel'nyi-marksheiderskii*)
IIjj. Motion picture engineering (*Fakul'tet kinoinzhenerov*)
IIkk. Petroleum (*Neftianoi*)
IIll. Oil processing mechanics (*Neftemekhanicheskii*)
IImm. Oil production (*Neftepromyslovyi*)
IInn. Peat (*Torfianoi*)
IIoo. Petroleum technology (*Neftetekhnologicheskii*)
IIpp. Physico-mechanical (*Fiziko-mekhanicheskii*)
IIqq. Physico-technical (*Fiziko-tekhnicheskii*)
IIrr. Power engineering (*Energeticheskii*)
IIss. Power machinery construction (*Energomashinostroitel'nyi*)
IItt. Precision mechanics (*Fakul'tet tochnoi mekhaniki*)
IIuu. Radiotechnical (*Radiotekhnicheskii*)
IIvv. Ship repair (*Sudoremontnyi*)
IIww. Shipbuilding (*Korablestroitel'nyi*)
IIxx. Silicates (*Silikatnyi*)
IIyy. Technological [general unspecified] (*Tekhnologicheskii*)
IIzz. Technology of inorganic chemical industry (*Fakul'tet tekhnologii neorganicheskikh veshchestv; Fakul'tet neorganicheskikh veshchestv*)
IIaaa. Technology of organic substances (*Fakul'tet tekhnologii organicheskikh veshchestv*)
IIbbb. Technology of castings and locomotive building (*Fakul'tet liteinogo proizvodstva i lokomotivostroeniia*)

III. INSTITUTES OF POWER AND ELECTRICAL ENGINEERING, RADIO-ENGINEERING, AND ENGINEERING PHYSICS[1]

IIIaa. Aerial mechanics (*Aeromekhanika*)
IIIa. Design and production technology of radio equipment (*Fakul'tet konstruirovaniia i tekhnologii proizvodstva radioapparatury*)
IIIb. Electrical equipment (*Fakul'tet elektropriborostroeniia*)
IIIc. Electronics (*Fakul'tet elektronnoi tekhniki*)
IIId. Electronic and vacuum engineering and instrument construction (*Fakul'tet elektrovakuumnoi tekhniki i priborostroeniia*)
IIIdx. Electronics and computational technology (*Fakul'tet elektroniki i schetno-reshaiushchei tekhniki*)
IIIe. Hydroelectric power engineering (*Gidroenergeticheskii*)
IIIf. Electrification of industry and transport (*Fakul'tet elektrifikatsii promyshlennosti i transporta*)
IIIg. Industrial power engineering (*Fakul'tet promyshlennoi teploenergetiki*)
IIIh. Radiophysics (*Radiofizika*)
IIIi. Radio engineering and electronics (*Fakul'tet radiotekhnicheskoi elektroniki*)
IIIix. Physics and Chemistry (*Fiziko-khimicheskii*)
IIIj. Telemechanics and automatic equipment (*Fakul'tet telemekhaniki i avtomatiki*)

IV. INSTITUTES OF MACHINE BUILDING, SHIPBUILDING, AVIATION ENGINEERING, PRINTING-PUBLISHING AND CINEMA ENGINEERING

IVa. Aircraft construction (unspecified) (*Aviatsionnyi*)
IVb. Aircraft construction (body and frame) (*Samoletrostroitel'nyi*)
IVc. Aircraft construction technology (*Aviatekhnologicheskii*)
IVd. Aircraft engines (and propulsion devices) (*Fakul'tet aviatsionnykh dvigatelei*)
IVe. Aircraft instruments and automatic devices (*Fakul'tet aviatsionnykh priborov i avtomatov*)
IVf. Aircraft mechanical equipment engineering (*Aviamekhanicheskii*)
IVg. Agricultural machine building (*Fakul'tet sel'skokhoziaistvennogo mashinostroeniia*)
IVh. Art work in book publishing and printing (*Fakul'tet khudozhestvennogo oformleniia pechatnoi produktsii*)
IVi. Automobile construction (*Avtomobil'nyi*)
IVix. Computers and computing devices (*Fakul'tet vychislitel'nykh matematicheskikh ustroistv*)
IVj. Design engineering (*Konstruktorskii*)
IVk. Editing of political literature and book publishing (*Fakul'tet redaktirovaniia politicheskoi i khudozhestvennoi literatury*)
IVl. Electromechanical equipment (*Fakul'tet elektromekhanicheskikh ustanovok*)
IVm. Forging and pressing process engineering (*Fakul'tet kuznechno-pressovogo proizvodstva*)
IVn. Heat transfer and hydraulic machinery and devices (*Fakul'tet teplovykh i gidravlicheskikh mashin*)
IVo. Machine building and casting technology (*Fakul'tet mashin i tekhnologii liteinogo proizvodstva*)
IVp. Machine tool and tool and die engineering (*Stankoinstrumental'nyi*)
IVq. Maintenance of aircrafts and aircraft engines (*Fakul'tet tekhnicheskoi ekspluatatsii samoletov i dvigatelei*)
IVs. Metallurgical engineering: hot-rolling and forging (*Fakul'tet goriachei obrabotki metallov*)
IVt. Metal pressing equipment (*Fakul'tet obrabotki metallov davleniem*)
IVu. Mining machinery construction (*Fakul'tet gornogo mashinostroeniia*)
IVv. Optical equipment (*Opticheskii*)
IVvx. Physics and power engineering (*Fiziko-energeticheskii*)
IVw. Printing equipment (*Fakul'tet poligraficheskikh mashin*)
IVx. Printing technology (*Fakul'tet tekhnologii poligraficheskogo proizvodstva*)
IVy. Technology of machine building (*Fakul'tet tekhnologii mashinostroeniia*)
IVyx. Theoretical and experimental physics (*Fakul'tet teoreticheskoi i eksperimental'noi fiziki*)
IVz. Tractor building (*Traktornyi fakul'tet*)
IVaa. Transportation equipment construction (*Fakul'tet transportnogo mashinostroeniia*)
IVbb. Welding technology (*Fakul'tet svarochnogo proizvodstva*)

V. GEOLOGICAL, MINING, PETROLEUM, PEAT AND METALLURGICAL INSTITUTES

Va. Chemical-metallurgical (*Khimiko-metallurgicheskii*)
Vb. Explorations and surveying (*Fakul'tet tekhniki razvedki*)

[1] The divisions listed below (sections III–IX) are in addition to similar divisions of polytechnical and industrial institutes. In other words, if a division of the same name and type was in existence in polytechnical and industrial institutes, it was *not* listed below though it might exist in other engineering higher educational establishments as well.

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Vc. Geophysics (*Geofizicheskii*)
Vd. Hydrogeology (*Gidrogeologicheskii*)
Ve. Mine construction (*Shakhtostroitel'nyi*)
Vf. Mine surveying (*Marksheiderskii*)
Vg. Mining electro-mechanical equipment (*Gorno-elektromekhanicheskii*)
Vh. Mining geology (*Gornogeologicheskii*)
Vi. Physical chemistry (*Fiziko-khimicheskii*)
Vj. Road construction (*Stroitel'no-dorozhnyi*)

VI. INSTITUTES OF CHEMICAL TECHNOLOGY

VIa. Basic organic synthesis technology (*Fakul'tet tekhnologii osnovnogo organicheskogo sinteza*)
VIb. Chemical engineering (*Inzhenernyi khimiko-tekhnologicheskii*)
VIc. Fine chemistry technology (*Fakul'tet tonkoi khimicheskoi tekhnologii*)
VId. Fuels technology (*Fakul'tet khimicheskoi tekhnologii topliva*)
VIe. Mechanical engineering and machinery in inorganic chemical industry (*Mekhanicheskii fakul'tet neorganicheskikh proizvodstv*)
VIex. Mechanical engineering and machinery in organic chemical industry (*Mekhanicheskii fakul'tet organicheskikh proizvodstv*)
VIf. Physical chemistry engineering (*Inzhenernyi fiziko-khimicheskii*)
VIg. Rubber technology (*Fakul'tet tekhnologii reziny*)
VIh. Silicate technology (*Fakul'tet tekhnologii silikatov*)

VII. FOOD TECHNOLOGY AND FISH INDUSTRY INSTITUTES

VIIa. Food technology (*Fakul'tet pishchevykh proizvodstv*)
VIIb. Ichthyology (*Ikhtiologicheskii*)
VIIc. Industrial fisheries (*Fakul'tet promyshlennogo rybolovstva*)
VIId. Processing and storing of grain and grain products (*Fakul'tet pererabotki i khraneniia zerna*)
VIIe. Refrigeration equipment (*Fakul'tet kholodil'nykh mashin*)
VIIf. Refrigeration technology (*Kholodil'nyi*)
VIIg. Veterinary (*Veterinarnyi*)

VIII. INSTITUTES OF LIGHT INDUSTRY

VIIIa. Applied art and fashioning (*Fakul'tet prikladnogo iskusstva*)
VIIIb. Garment manufacturing (*Shveino-trikotazhnyi*)

IX. CONSTRUCTION, GEODESY, AND ROAD BUILDING INSTITUTES

IXa. Architecture (*Arkhitekturnyi*)
IXb. Aerial photography and geodesy (*Fakul'tet aerofotogeodezii*)
IXbx. Automotive transport (Auto-park maintenance) (*Avtomobil'nyi*)
IXc. Cartography (*Kartograficheskii*)
IXd. Construction technology (*Stroitel'no-tekhnologicheskii*)
IXe. Gas supply, thermal systems and ventilation (*Fakul'tet teplogazosnabzheniia i ventiliatsii*)
IXf. Geodesy (*Geodezicheskii*)
IXg. Highway engineering and automotive transport (*Avtomobil'no-dorozhnyi, fakul'tet avtomobil'nykh dorog, dorozhnyi, dorozhno-stroitel'nyi*)
IXgx. Industrial transport (*Fakul'tet promyshlennogo transporta*)
IXh. Optics and mechanical engineering (*Optiko-mekhanicheskii*)
IXi. Sanitary engineering (*Sanitarno-tekhnicheskii*)
IXj. Urban development and city management (*Fakul'tet gorodskogo stroitel'stva i khoziaistva*)
IXk. Urban electric transport (*Fakul'tet gorodskogo elektricheskogo transporta*)
IXl. Water supply and sewerage (*Fakul'tet vodosnabzheniia i kanalizatsii*)

X. INSTITUTES OF HYDRO-METEOROLOGY

Xa. Hydrogeology (*Gidrogeologicheskii*)
Xb. Meteorology (*Meteorologicheskii*)

XI. TRANSPORT AND COMMUNICATION INSTITUTES

XIa. Arctic (navigation and shipping operations) (*Arkticheskii*)
XIax. Automatics, telemechanics and electronics (*Fakul'tet avtomatiki, telemekhaniki i elektroniki*)
XIb. Bridges and tunnels (*Fakul'tet mostov i tonnelei*)
XIc. Economics of construction (*Fakul'tet ekonomiki stroitel'stva*)
XId. Economics of railroad transport (*Fakul'tet ekonomiki zheleznodorozhnogo transporta*)
XIe. Electrification of railroads (*Fakul'tet elektrifikatsii zheleznodorozhnogo transporta; fakul'tet elektricheskogo transporta*)
XIf. Equipment and mechanization of harbors (*Fakul'tet oborudovaniia i mekhanizatsii portov*)
XIg. Industrial and civil construction (*Fakul'tet promyshlennogo i grazhdanskogo stroitel'stva*)
XIh. Maritime navigation (*Sudovoditel'skii*)
XIi. Mechanization (of loading-unloading operations) (*Fakul'tet mekhanizatsii*)
XIj. Operations and exploitation (*Ekspluatatsionnyi*)
XIk. Radio communications and broadcasting (*Fakul'tet radiosviazi i radioveshchaniia*)
XIl. River navigation, operation and exploitation of river transport (*Fakul'tet sudovozhdeniia i ekspluatatsii vodnogo transporta*)
XIm. Ships mechanical engineering (*Sudomekhanicheskii*)
XIn. Telegraph-telephone communication (*Fakul'tet telegrafno-telefonnoi sviazi*)

XII. AGRICULTURAL AND FORESTRY INSTITUTES

XIIa. Chemical technology of wood processing (and pulp industry) (*Fakul'tet khimicheskoi tekhnologii drevesiny*)
XIIb. Forestation (forest management) (*Lesokhoziaistvennyi*)
XIIc. Mechanical engineering in timber industry (*Lesomekhanicheskii*)
XIId. Mechanical technology of wood processing (and pulp industry) (*Fakul'tet mekhanicheskoi tekhnologii drevesiny*)

XIII. ENGINEERING-ECONOMICS (MANAGEMENT) INSTITUTES

XIIIa. Accounting and economics (*Uchetno-ekonomicheskii*)
XIIIb. Agricultural economics (*Sel'skokhoziaistvennyi; fakul'tet ekonomiki sel'skogo khoziaistva*)
XIIIc. Automobile and air transport (*Fakul'tet avtomobil'nogo i vozdushnogo transporta*)
XIIId. Chemical industry (*Khimicheskii*)
XIIIe. Chemical and metallurgical industry (*Khimiko-metallurgicheskii*)
XIIIf. Credit (management) and economics (*Kreditno-ekonomicheskii*)
XIIIg. Economics and statistics (*Ekonomiko-statisticheskii*)
XIIIh. Finance (*Finansovyi*)
XIIIi. Finance and credit (*Finansovo-kreditnyi*)
XIIIj. Finance and economics (*Finansovo-ekonomicheskii*)
XIIIk. General economics (*Fakul'tet obshcheekonomicheskii*)

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XIIIl. Grain storage and grain processing industry—economics (*Fakul'tet ekonomiki promyshlennosti po khraneniiu i pererabotke zerna*)
XIIIm. Industrial (mining-manufacturing) economics (*Fakul'tet ekonomiki promyshlennosti* [and] *promyshlenno-ekonomicheskii*)
XIIIn. Material—technical supply (unspecified) (*Fakul'tet maternal'no-tekhnicheskogo snabzheniia*)
XIIIo. Material—technical supply economics and planning (*Fakul'tet ekonomiki i planirovaniia material'no-tekhnicheskogo snabzheniia*)
XIIIp. Mechanized accounting (*Fakul'tet mekhanizatsii ucheta*)
XIIIq. Merchandising (*Tovarovedeniia*)
XIIIr. Planning of national economy (*Fakul'tet planirovaniia narodnogo khoziaistva*)
XIIIs. Planning and economics (*Planovo-ekonomicheskii*)
XIIIt. Trade and accounting (*Torgovo-uchtenyi*)
XIIIu. Trade and distribution and economics (*Torgovo-ekonomicheskii*)

XIV. MEDICAL, HEALTH AND PHYSICAL CULTURE INSTITUTES

Soviet official directories do not list any divisions for these institutes. It is known from other primary sources, however, that medical institutes have five types of divisions: [4]

XIVa. General medical (medicine and surgery) (*Lechebnyi*) (actually healing arts)
XIVb. Pediatric medicine (*Pediatricheskii*)
XIVc. Public health (*Sanitarno-gigienicheskii*)
XIVd. Dentistry (stomatology) (*Stomatologicheskii*)
XIVe. Pharmaceutical (*Farmatsevticheskii*)

Institutes of physical culture have two types of divisions:

XIVf. Sports (*Sportivnyi*) (Training professional sportsmen and coaches)
XIVg. Pedagogical (*Pedagogicheskii*) (Training physical culture teachers)

[4] Ministerstvo Zdravookhraneniia SSSR, *Zdravookhranenie v SSSR; statisticheskii spravochnik* (Public Health in the U.S.S.R.; Statistical Handbook), Moscow, 1957, pp. 151–56.

XV. PEDAGOGICAL AND ART INSTITUTES

Soviet official directories do not list any divisions for these institutes. It is ascertainable from other sources, however, that pedagogical institutes sometimes have divisions of the following types: (1) history-philology, (2) physics, (3) physics-mathematics, (4) mathematics, (5) natural sciences, (6) romance languages, (7) Germanic languages. There may be other divisions and a thorough check of institutions was not available.

In Institutes of Library Science there are two divisions which have been encountered. One is "librarianship," the other "cultural service."

Although it is occasionally mentioned in Soviet sources that art institutes also have divisions (*fakul'tet*), the term by which they are most commonly known is branch department (*otdelenie*). The following types of *otdelenie* have been encountered: (1) stage management, (2) production, (3) conducting, (4) choreography, (5) performing instrument (piano, violin, etc.), (6) theater history, (7) sculpture, (8) architecture, (9) graphics, (10) history of architecture. There may be other branch departments, but an exhaustive check of institutions was not available.

APPENDIX IV–B–3.—*Directory of Institutes, Universities, Divisions and Specialties in Soviet Higher Educational Establishments as of 1959*

This directory has been prepared on the basis of the Soviet directories (*Sprav VUZ–1957, Sprav VUZ–1958 and Sprav VUZ–1959*) by recoding all the existing divisions and specialties in accordance with the decimal classification code of specialties presented in Appendix IV–B–1 and the letter and number code for the divisions presented in Appendix IV–B–2. The purpose of preparing this directory was not only to provide a comprehensive summary in English of individual divisions and specialties taught in each Soviet higher educational establishment, but also to enable the reader to have a complete guide to the offerings by institution in each specialty presented in Appendix IV–B–1. In other words, Appendix IV–B–1 constitutes an inversion of the data presented in this appendix. In short, we wanted to know exactly what is being taught, and where, in all higher educational establishments of the U.S.S.R. The institutional data are as of the academic year 1959–60.

The roman numeral and small letter code was designed for the special purposes of processing data and the full name of each division thus coded is code refers to the Soviet official identification of found in Appendix IV–B–2. The 4-digit decimal specialties, with the two last digits replaced by the letters X, Y, Z, P or Q (in paired combination) when the exact code was not known, though the specialty could be definitely identified.

In addition, under the name of each institution there appears information as to whether it offered evening and/or extension-correspondence training as of 1959.

The roman and arabic number combination in front of each institution was assigned in sequence, by grouping institutions according to the specialty branch, i.e., institutional reporting as explained in the text. Wherever numbers are omitted, the institution was either closed or transferred. Where new institutions have been added, a capital letter was introduced in order not to disrupt the sequence. The institutions are listed within each given specialty branch in accordance with the Russian alphabet, which is in transliteration as follows: A, B, V, G, D, E, Zh, Z, I, I (short), K, L, M, N, O, P, R, S, T, U, F, Kh, Ts, Ch, Sh, Shch, Y (hard), Iu, Ia.

The location of a given institution is italicized,

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either in the name of the institution if included or else stated after the name.

Whenever enrollment or graduation data for individual institutions were conveniently available, they have been listed: A—acceptances; E—enrollment; G—graduations, with an indication of the year to which the data refer.

For each institution it is indicated whether it offers advanced degree training and has the right to award the degrees of candidate and/or doctor (indicated by C and D). The presence of advanced degree training is an indication of the qualitative strength of a higher educational institution. Appendix V–C–1 gives a listing of the institutions offering advanced degree training in higher educational establishments as well as in research institutes. Offerings of advanced degree training in higher educational establishments only are listed in Appendix IV–B–3. They are as of 1956–57 and were compiled from *VyShkoSPR–1957, passim*. A complete check of aspirantura by specialty field for the last available year (1959) revealed that whenever advanced degrees were offered, they closely paralleled the fields which were offered as higher education specialties by the institution involved.

DIRECTORY OF INSTITUTIONS, DIVISIONS AND SPECIALTIES IN SOVIET HIGHER EDUCATIONAL ESTABLISHMENTS

I. UNIVERSITIES

I–1. Azerbaidzhan State University (of S.M. Kirov) in *Baku*
Advanced Degrees: C; D.
Iw: 2008
Icc: 2001; 2002; 2027; 2113
Ibb: 2005
Iaa: 1801
Is: 1732; 1734; 1737; 17XX
Im: 2013; 2014
Iq: 2016
Id: 2018
Ib: 2020; 2021
Ij: 0102; 2107
Evening
Extension-Correspondence

I–2. Bashkir State University in *Ufa*
Advanced Degrees: none
Iy: 2001; 2002; 2008
Ir: 2013; 2016
Ib: 2018; 2019
Ih: 2025
Iu: 2004
Extension-Correspondence

I–3. Belorussian State University (of V.I. Lenin) in *Minsk*
Advanced Degrees: C; D
Iw: 2008
Icc: 2001; 2002; 2027
Iaa: 1801
Irr: 2013
Iq: 07XX; 07XZ; 2016
Id: 2018
Ib: 2020; 2021
Ij: 2025
Evening
Extension-Correspondence

I–4. *Vilnius* State University (of V. Kapsukas)
Advanced Degrees: C; D
Iy: 2001; 2002; 2008; 2027; 2113
Is: 1734; 1737; 17XX
Iaa: 1801
Ir: 2013; 2016
Id: 08XZ; 2018
Io: 0102; 2020; 2021; 2025
In: 1901
Evening
Extension-Correspondence

I–5. *Voronezh* State University
Advanced Degrees: C; D
Iy: 2001; 2008
Im: 2013; 2014
Iq: 07XX; 2016
Id: 2018
Ic: 1501; 2020; 2021
Ii: 0101
Ih: 1401; 1404
Evening
Extension-Correspondence

I–6. *Gor'kii* State University (of N.I. Lobachevskii)
Advanced Degrees: C
Iy: 2001; 2008
Im: 2013; 2014
Iq: 07XX; 2016
Id: 2018
Ib: 2020; 2021

I–7. Dagestan State University in *Makhach-Kala*
Advanced Degrees: none
Iy: 2001; 2002; 2008
Ir: 2013; 2016
Io: 2019
Iu: 2004
If: 1007; 1202
Extension-Correspondence

I–8. Far-Eastern State University in *Vladivostok*
Advanced Degrees: none
Iy: 1801; 2001; 2008
Ir: 2013; 2016
Iu: 2004
Io: 1401; 1404; 1501; 2018; 2019
In: 1901
Extension-Correspondence

I–9. *Dnepropetrovsk* State University (of the 300th anniversary of the Re-union of Russia and the Ukraine)
Advanced Degrees: C; D
Icc: 2001; 2002
Ir: 2013; 2014; 2016
Irs: (no listing)
Id: 2018
Ib: 2019
Evening
Extension-Correspondence

I–10. *Erevan* State University
Advanced Degrees: C; D
Iw: 2008
Icc: 2001; 2002; 2005
Iu: 2004
Is: 1734; 1737; 17XX
Iaa: 1801
Ir: 2013; 2014; 2016
Id: 2018
Ib: 2019
Ii: 0101
Ih: 2025
Evening
Extension-Correspondence

I–11. *Irkutsk* State University (of A.A. Zhdanov)
Advanced Degrees: C
Iy: 2001; 2002; 2008
Iaa: 1801
Ir: 07XX; 2013; 2016
Id: 2018
Ic: 1501; 2020; 2021

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Ii: 0102; 0103
Ih: 2025
Evening
Extension-Correspondence

I–12. Kabardino-Balkar State University in *Nal'chik*
Advanced Degrees: none
Iy: 2001; 2002; 2004; 2008
Ir: 2013; 2016
Ic: 1502; 1506; 2019
Ie: 1202
Extension-Correspondence

I–13. *Kazan'* State University (of V.I. Ul'ianov (Lenin)
Advanced Degrees: C; D
Iy: 2001; 2002; 2008
Iaa: 1801
Ir: 07XX; 1302; 2013; 2014; 2016
Id: 2018
Ic: 1501; 2020; 2021
Ii: 0102; 0103; 0105
Ih: 1404; 2025
Evening
Extension-Correspondence

I–14. Kazakh State University (of S.M. Kirov) in *Alma-Ata*
Advanced Degrees: C; D
Iw: 2008
Icc: 2001; 2002; 2027
Iaa: 1801
Is: 1734; 1737; 17XX
Ir: 2013; 2016
Id: 2018
Ic: 2020; 2021
Ih: 2025; 2026
Evening
Extension-Correspondence

I–15. *Kiev* State University of T.G. Shevchenko
Advanced Degrees: C; D
Iee: 2008; 2011; 2012
Icc: 2001; 2002; 2004
It: 1801; 2010
Im: 2013; 2014
Iq: 2015; 2016
Id: 2018
Irt: 07XZ; 07YX
Ib: 2019
Iy: 0102; 0107
Ih: 2025
Evening
Extension-Correspondence

I–16. Kirgiz State University in *Frunze*
Advanced Degrees: C
Iy: 2008
Icc: 2001; 2002; 2027
Iu: 2103
It: 17XX; 1801
Ir: 2013; 2016
Ih: 2025
Ic: 2018; 2020; 2021
Extension-Correspondence

I–17. *Kishinev* State University
Advanced Degrees: C
Iy: 2001; 2002; 2008
Is: 1734; 17XX
Ir: 2013; 2016
Id: 08XZ; 2018
Ic: 1501; 2020; 2021
Evening

I–18. Latvian State University (of Peter Stuchka) in *Riga*
Advanced Degrees: C; D
Iy: 2001; 2002; 2004; 2008
It: 1734; 17XX; 1801
Ir: 2013; 2016
Id: 2018
Ib: 2020; 2021
Ih: 2025
Evening
Extension-Correspondence

I–19. *Leningrad* State University (of A.A. Zhdanov)
Advanced Degrees: C; D
Iw: 2008
Is: 2010
Idd: 2011; 2012
Icc: 2001; 2003; 2004; 2005; 2005a; 2005b; 2006; 2027
Ibb: 2005
Iaa: 1801
Iq: 2016, 2017
Im: 2014; 2015
Id: 2018
Ic: 1501; 2020; 2021; 2022; 2023
Ii: 0102; 0105; 0106; 0107
Ih: 1404; 2025; 2026
Evening
Extension-Correspondence
Total: E (1956)—10856

I–20. *L'vov* State University (of Ivan Franko)
Advanced Degrees: C; D
Iw: 2008
Icc: 2001; 2002; 2003; 2006
Iz: 2027
Iu: 2004
Iaa: 1801
Iq: 2016
Im: 2013; 2014
Id: 2018
Ib: 2019
Ii: 0101; 0102; 0103; 0106
Ih: 2025
Extension-Correspondence

I–21. Mordvin State University in *Saransk*
Advanced Degrees: none
Iy: 2001; 2002; 2008
Ir: 2013; 2016
Io: 2018; 2019
Iu: 2004
If: 0303; 1202
Ia: 1502; 1506; 1509
Extension-Correspondence

I–22. *Moscow* State University (of M.V. Lomonosov)
Advanced Degrees: C; D
Iw: 2008
Icc: 2001; 2004; 2006
Iz: 2027
Idd: 2011; 2012
Is: 2010
Iaa: 1801
Iq: 07XZ; 07YX; 2016; 2017
Im: 2013; 2014; 2015
Id: 2018
Ic: 1501; 2020; 2021; 2022; 2023; 2024
Ii: 0101; 0102; 0103; 0105; 0106; 0107
Ih: 1304; 1401; 1402; 1404; 2025; 2026
Evening
Extension-Correspondence

I–22A. *Novosibirsk* State University
Advanced Degrees: none
No divisions given: 2013; 2014; 2016; 2018; 2019

I–23. *Odessa* State University (of I.I. Mechnikov)
Advanced Degrees: C; D
Iw: 2008
Icc: 2001; 2002
Ir: 2013; 2015; 2016
Id: 2018
Ib: 2019
Ih: 2025
Evening
Extension-Correspondence

I–24. *Perm'* State University (of A.M. Gor'kii)
Advanced Degrees: C
Iy: 2001; 2008
Iaa: 1801
Is: 07XX; 1737; 17XX
Ir: 2013; 2016
Id: 2018

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Ib: 2020; 2021
Ii: 0101; 0107
Ih: 2025
If: 0407; 0516; 0803
Extension-Correspondence

I–25. *Petrozavodsk* State University
Advanced Degrees: C
Iy: 2001; 2008
Ir: 2013; 2016
Ig: 0519; 0901; 1202
Ia: 1502; 1506
Evening
Extension-Correspondence

I–25a. Evening branch of Petrozavodsk State University at *Onega* tractor plant: 0519; 1202; 2001; 2013

I–26. *Rostov* State University
Advanced Degrees: C; D
Iy: 2001; 2008
Ir: 07XZ; 2013; 2014; 2016
Id: 2018
Ic: 2020; 2021
Ij: 0101; 2025
Iaa: 1801
Evening
Extension-Correspondence

I–27. *Saratov* State University (of N.G. Chernyshevskii)
Advanced Degrees: C; D
Iw: 2008
Icc: 2001
Im: 0609; 2013; 2014
Iq: 07XX; 07XZ; 2016
Id: 2018
Ib: 2020; 2021
Ih: 0102; 0105; 2025; 2026
Evening
Extension-Correspondence

I–28. Central Asiatic State University (of V.I. Lenin) in *Tashkent*
Advanced Degrees: C; D
Iw: 2008
Icc: 2001; 2002; 2027
Ibb: 2005
Iaa: 1801
Ir: 2013; 2014; 2016; 2017
Id: 2018
Ic: 1501; 2020; 2021
Ii: 0102; 0107; 1401; 2025
Extension-Correspondence

I–29. Tadzhik State University (of V.I. Lenin) in *Stalinabad*
Advanced Degrees: C
Iy: 2001; 2002; 2005; 2008
Iaa: 1801
Is: 17XX
Ir: 2013; 2016
Io: 0102; 2018; 2020; 2021
Evening
Extension-Correspondence

I–30. *Tartu* State University
Advanced Degrees: C; D
Iy: 2001; 2002; 2004; 2008
Iaa: 1801
Ip: 2013; 2016; 2018; 2019; 2025
Is: 1729; 1734; 1737
In: 1901; 1902; 1903; 1904; 1905; 21ZZ
Extension-Correspondence

I–31. *Tbilisi* State University (of I.V. Stalin)
Advanced Degrees: C; D
Iw: 2008
Icc: 2001; 2002; 2005; 2027
Iv: 2004
Is: 1734; 1737; 17XX
Iaa: 1801; 2011; 2012
Im: 2013; 2014
Iq: 07YX; 2016
Id: 2018
Ib: 2020; 2021
Ij: 0102; 2025
Evening
Extension-Correspondence

I–32. *Tomsk* State University (of V.V. Kuibyshev)
Advanced Degrees: C; D
Iy: 2001; 2008
It: 17XX; 1801
Iq: 07XX; 2016
Im: 2013; 2014
Id: 2018
Ic: 1501; 2020; 2021
Ij: 0102; 0106; 1401; 1404; 2025
Evening
Extension-Correspondence

I–33. Turkmen State University (of A.M. Gor'kii) in *Ashkhabad*
Advanced Degrees: C
Icc: 2001; 2002; 2004
Ix: 2008
Ir: 2013; 2016
If: 1202; 1209
Icx: 2019; 2025; 21ZZ
Evening
Extension-Correspondence

I–34. *Uzhgorod* State University
Advanced Degrees: none
Icc: 2001; 2002
Iw: 2008
Ir: 2013; 2016
Id: 2018
Ib: 2019
In: 1901
Extension-Correspondence

I–35. Uzbek State University (of Alisher Navoi) in *Samarkand*
Advanced Degrees: C
Iw: 2008
Icc: 2001; 2002; 2004
Ir: 2013; 2016
Ib: 2020; 2021; 2025
Evening
Extension-Correspondence

I–36. Ural State University (of A.M. Gor'kii) in *Sverdlovsk*
Advanced Degrees: C
Iw: 2008
Icc: 2001; 2027
Ir: 2013; 2014; 2016
Id: 2018
Ib: 2020; 2021
Evening
Extension-Correspondence

I–37. *Khar'kov* State University (of A.M. Gor'kii)
Advanced Degrees: C; D
Iw: 2008
Icc: 2001; 2002
Ir: 2013; 2014; 2015; 2016
Irt: 07XZ; 07YX
Id: 2018
Ib: 2019
Ih: 2025
Evening
Extension-Correspondence

I–38. *Chernovtsy* State University
Advanced Degrees: C
Iw: 2008
Icc: 2001; 2002
Iu: 2004
Ir: 2013; 2016
Id: 2018
Ib: 2019
Ih: 2025
Extension-Correspondence

I–39. *Iakutsk* State University
Advanced Degrees: none
Ik: 2001; 2002; 2008
Ir: 2013; 2016
Io: 1901; 2025

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If: 0101; 0202; 1202
Ia: 1506; 1507; 2019
Extension-Correspondence

II. POLYTECHNICAL AND INDUSTRIAL INSTITUTES

II–1. Azerbaidzhan Polytechnical Institute in *Baku*
Advanced Degrees: C
IIz: 0501; 0502; 1609
IIrr: 0301; 0601
IIh: 1201; 1202; 1208; 1209; 1211
IIu: 1511
Evening

II–2. Azerbaidzhan Industrial Institute (of M. Azizbekov) in *Baku*
Advanced Degrees: C; D
IIr: 0103; 0105; 0107
IImm: 0205
IIyy: 0607; 0801; 0807
IIll: 0508; 0516; 0606
IIo: 1706
Evening
Extension-Correspondence

II–3. Belorussian Polytechnical Institute (of I.V. Stalin) in *Minsk*
Advanced Degrees: C
IIx: 0501
IIaa: 0502; 0503
IIc: 0513; 1211; 1609
IIrr: 0301; 0303; 0305; 0701
IIf: 0806; 08XZ; 1004
IIh: 1201; 1202; 1208; 1209
IIv: 0511; 1203
IInn: 0203; 0507
Evening
Extension-Correspondence

II–3a. Evening branch of Belorussian Polytechnical Institute in *Minsk* Automobile Factory
No divisions listed: 0501; 0502; 0513; 1609

II–3b. Evening branch of Belorussian Polytechnical Institute in *Vitebsk*
No divisions listed: 0501; 1202

II–3A. *Voronezh* Evening Polytechnical Institute
IIaa: 0303; 0501; 0502; 0503; 0704
Extension-Correspondence

II–4. *Gor'kii* Polytechnical Institute (of A. A. Zhdanov)
Advanced Degrees: C
IIx: 0503; 0513; 0516; 0607
IIz: 0501
IIm: 0303; 0608
IIuu: 0701; 0704
IIbb: 0404; 0407; 0408; 0504
IIww: 0514; 0525
IId: 0803; 0805; 0806; 0807
Evening
Extension-Correspondence

II–4a. Evening branch of Gor'kii Polytechnical Institute in the *Gor'kii* Automobile Plant
No divisions listed: 0404; 0501; 0503; 0513

II–4b. Evening branch of Gor'kii Polytechnical Institute in the Plant *"Krasnoe Sormovo"*
No divisions listed: 0303; 0404; 0501; 0504; 0514; 0525

II–4c. Evening branch of Gor'kii Polytechnical Institute in *Dzerzhinsk*
No divisions listed: 0803; 0805; 0807

II–4d. Evening branch of Gor'kii Polytechnical Institute in the electrical equipment plant in *Cheboksary*
No divisions listed: 0501; 0601

II–5. Georgian Polytechnical Institute (of S.M. Kirov) in *Tbilisi*
Advanced Degrees: none
IIgg: 0101, 0202, 0304
IIbb: 0401; 0404; 0408
IIy: 0501; 0513; 0517; 0608; 1609
IIrr: 0301; 0303; 0308; 0606
IIf: 0803; 0805; 0806
IIh: 1201; 1202; 1203; 1208; 1209; 1211
IIw: 1002; 1102; 1105; 1108; 1109
Evening
Extension-Correspondence

II–6. Far-Eastern Polytechnical Institute (of V.V. Kuibyshev) in *Vladivostok*
Advanced Degrees: none
IIee: 0101; 0202; 0304
IIz: 0305; 0501
IIm: 0301; 0303
IIh: 1202; 1204
IIq: 1901
IIww: 0514; 0525; 06XX
Evening

II–7. Donets Basin Industrial Institute (of N.S. Khrushchev) in *Stalino*
Advanced Degrees: C
Iee: 0202
IIhh: 0303; 0304; 0506
IIii: 0101; 0201; 0206
IIbb: 0401; 0407; 0408; 0505
IIf: 0802
IIh: 1202
Evening
Extension-Correspondence

II–7a. Evening branch of Donets Basin Industrial Institute in *Kramatorsk*
No divisions listed: 0404; 0408; 0501; 0503; 0510; 1202

II–7b. Evening branch of Donets Basin Industrial Institute in *Makeevka*
No divisions listed: 0202; 0304; 0401; 0505; 1202

II–8. *Erevan* Polytechnical Institute (of K. Marx)
Advanced Degrees: C
IIz: 0501
IIm: 0301; 0303; 0601; 0606; 0608
IIf: 0803; 0807
IIh: 1201; 1202; 1208; 1209; 1211
Evening
Extension-Correspondence

II–9. *Kaunas* Polytechnical Institute
Advanced Degrees: C
IIz: 0308; 0501; 0803; 0902; 1102; 1104; 1108; 1709
IIm: 0301; 0303; 0701; 0704
IIf: 0203; 0806; 1009
IIh: 1201; 1202; 1205; 1206; 1301; 1609
IIv: 1203; 1209
Evening
Total: (E) (1956)–3979; G (1956)–536

II–9a. Evening branch of Kaunas Polytechnical Institute in *Vilnius*
No divisions listed: 0303; 0501; 0701; 0704; 1105; 1202

II–10. *Kiev* Polytechnical Institute
Advanced Degrees: C; D
IIee: 0202; 0304
IIbb: 0401; 0404; 0406; 0407
IIz: 0501; 0503; 0504
IIm: 0301; 0303; 0601; 0606; 0608
IIs: 0305; 0308; 0520; 0521
IIe: 0516
IIf: 0803; 0805; 0806; 0807; 0904
IIuu: 0604; 0611; 0612; 0701; 0704
IIjj: 0615
Evening
Extension-Correspondence

II–11. *Komsomol'sk-on-Amur* Evening Polytechnical Institute
Advanced Degrees: none
IIz: 0501
IIww: 0514
IIh: 1202

II–12. *Krasnoiarsk* Polytechnical Institute
Advanced Degrees: none
IIx: 0501; 1211; 1609
IIh: 1202; 1207
IIrr: 0303
Evening
Total: E (1956)–350; G (1956)–none

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II–13. *Kuibyshev* Industrial Institute (of V.V. Kuibyshev)
Advanced Degrees: C
IIz: 0501; 0504
IIkk: 0205; 0508
IIoo: 0516; 0801; 0810
IIt: 0305; 0308
IIm: 0301; 0303; 0606
IIfx: 0807
Evening

II–13a. Evening City Branch of *Kuibyshev* Industrial Institute
No divisions listed: 0301; 0303; 0501

II–13b. Evening branch of Kuibyshev Industrial Institute at *"Kuibyshevgidrostroi"*
No divisions listed: 0301; 0303; 0501; 1202

II–13c. Evening branch of Kuibyshev Industrial Institute in *Orenburg*
No divisions listed: 0501; 1202

II–13d. Evening branch of Kuibyshev Industrial Institute in *Novo-Kuibyshevo*
No divisions listed: 0801

II–14. *Leningrad* Polytechnical Institute (of M. I. Kalinin)
Advanced Degrees: C; D
IIbb: 0401; 0402; 0403; 0404; 0407; 0408; 0504
IIy: 0501; 0503; 0510; 0511; 0518; 0527; 05XZ
IIk: 0301; 0302; 0303; 03XX; 0601; 0602; 0603; 0606
IIss: 0520; 0521; 0523; 0528; 0529
IIpp: 0309; 0406
IIuu: 0604; 0608; 0612; 07XX
IIv: 0307; 08XY; 1203; 1204
IIo: 1709
Evening
Total: E (1956)–11,209

II–15. *L'vov* Polytechnical Institute
Advanced Degrees: C; D
IIr: 1301; 1302; 1303
IImm: 0205; 0508; 0801
IIz: 0501; 0504
IIrr: 0301; 0303; 0305; 0601
IIuu: 0606; 0611; 0701; 0704
IIf: 0607; 0803; 0806; 0807; 0808; 0810
IIn: 1202; 1211
Evening
Extension-Correspondence
Regular: E (1957)–6876
Evening: E (1957)–844
Ext.Cor. E (1957)–1957

II–16. *Novocherkassk* Polytechnical Institute (of Sergo Ordzhonikidze)
Advanced Degrees: C
IIgg: 0101; 0107; 0201
IIee: 0202
IIhh: 0206; 0304
IIz: 0501; 0523; 1609
IIrr: 0301; 0305
IIk: 0303; 0601; 0606
IIf: 0516; 0607; 0803; 0805; 0806
IIh: 1202; 1209
Evening
Extension-Correspondence

II–16a. Division of Novocherkassk Polytechnical Institute in *Novye Shakhty*:
No divisions listed: 0206; 0506; 0510; 0511

II–16b. Evening branch of *Novye Shakhty* Division:
No divisions listed: 0201; 0202; 0206; 0304; 0501

II–17. *Odessa* Polytechnical Institute
Advanced Degrees: C
IIz: 0501; 0502; 0510
IIt: 0305; 0308
IIm: 0303; 0606
IIf: 0516; 0607; 0807
Evening
Extension-Correspondence

II–18. *Penza* Polytechnical Institute
Advanced Degrees: none
IIz: 0501; 0502
IIk: 07XY
IIm: 0606
IItt: 0531
IIuu: 0608; 0701; 0704
Evening
Extension-Correspondence
Regular: E (1956)–3872; G (1956)–387
Ext.Cor.: E (1956)–280; G (1956)–none

II–18A. *Riga* Polytechnical Institute
Advanced Degrees: none
IIj: 0301; 0303; 0308; 0606
IIz: 0501; 0531;
IIh: 1201; 1202; 1208; 1211
IIfx: 08XZ; 1102
Evening
Extension-Correspondence

II–19. Central Asiatic Polytechnical Institute in *Tashkent*
Advanced Degrees: C; D
IIr: 0101; 0105; 0107; 0108
IIee: 0202; 0304
IIz: 0501; 0502; 0509; 0516; 1609
IIrr: 0301; 0303; 0305; 0601; 0607
IIf: 0803; 0806; 1004; 1005; 1006; 1009
IIh: 1201; 1202; 1203; 1208; 1209; 1211
Evening

II–19a. Evening branch of Central Asiatic Polytechnical Intitute in *Cherchik*
No divisions listed: 0303; 0501; 0803; 1202

II–19b. Evening branch of Central Asiatic Polytechnical Institute in *Almalyk*:
No divisions listed: 0202; 0304; 1202

II–20. *Stalinabad* Polytechnical Institute
Advanced Degrees: none
IIh: 1202; 1209; 1609
IIrr: 0301; 0303
IIyy: 1101; 1102

II–21. *Tallinn* Polytechnical Institute
Advanced Degrees: C
IIff: 0202; 0802; 0803; 0806; 1010; 1103
IIz: 0301; 0303; 0305; 0501; 0518; 0606; 1609; 1709
IIh: 1202; 1209; 1211
IIvv: 0514; 0525
Evening
Extension-Correspondence
Total: E (1956)–2662

II–22. *Tomsk* Polytechnical Institute (of S.M. Kirov)
Advanced Degrees: C; D
IIr: 0101; 0103; 0105; 0107; 0108
IIee: 0201; 0202; 0204
IIz: 0407; 0501; 0504; 0516; 0523; 0607
IIt: 0305; 0308; 0520
IIj: 0301; 0302; 06YY
IIk: 0303; 0304; 0601; 0603
IIuu: 0604; 0606; 0611; 0612; 0608; 06XZ; 0701; 0704; 07YY
IIf: 0802; 0803; 0806; 0807; 0809; 0810; 0812
IIqq: no specialties given
Evening
Extension-Correspondence
Total: E (1956)–8481; G (1956)–1301

II–23. Ural Polytechnical Institute (of S.M. Kirov) in *Sverdlovsk*
Advanced Degrees: C; D
IIcc: 0401; 0407; 0408; 0505
IIdd: 0402; 0403; 0404; 0406
IIz: 0501; 0504; 0510; 0511
IIrr: 0301; 0303; 0305; 0308; 0601
IIuu: 0606; 0701; 0704
IIf: 0516; 0802; 0803; 0805; 0808; 0809; 0810
IIg: 0806
IIh: 1201; 1202; 1206; 1208; 1209
IIo: 1708; 1709; 1711
IIqq: no specialties given
Evening
Extension-Correspondence
Total: G (1956)–2103

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II–23a. Evening branch of Ural Polytechnical Institute in *Nizhnii Tagil*
No divisions listed: 0303; 0401; 0408; 0501; 1202
II–23b. Evening branch of Ural Polytechnical Institute in *Kurgan*
No divisions listed: 0303; 0501; 1202
II–24. *Ul'ianovsk* Evening Polytechnical Institute
Advanced Degrees: none
IIz: 0501
IIrr: 0303
IIh: 1202
Extension-Correspondence
II–25. *Frunze* Polytechnical Institute
Advanced Degrees: none
IIgg: 0101; 0202
IIz: 0501; 1609
IIyy: 1007; 1009
IIhx: 0301; 0303; 1202; 1203; 1211
Evening
II–26. *Khar'kov* Polytechnical Institute (of V.I. Lenin)
Advanced Degrees: C; D
IIbb; 0407; 0502; 0503
IIx: 0501; 0510
IIss: 0520; 0521; 0523; 0526; 0528
IIa: 0509; 0513
IIi: 0303; 0601; 0608
IIj: 0301; 0603; 0606
IIuu: 0611; 0701; 0704
IIzz: 0803; 0805
IIaaa: 0802; 0808; 0811; 1006
IIxx: 0516; 0806
IIp: 0406; 0527
Evening
Extension-Correspondence
II–26a. Evening branch of Khar'kov Polytechnical Institute in *Lugansk*
IIaa: 0501
IIbbb: 0502; 0526
II–26b. Evening branch of Khar'kov Polytechnical Institute in *Kirovograd*
No divisions listed: 0501; 0502; 0503
Extension-Correspondence
II–27. *Cheliabinsk* Polytechnical Institute
Advanced Degrees: none
IIbb: 0401; 0404; 0405; 0505
IIaa: 0501; 0503; 0504; 0516
IIc: 0513; 0523; 1609
IIrr: 0301; 0303; 0305
IIvx: 0606; 0704
IIn: 1202; 1206; 1207; 1209
Evening
Extension-Correspondence
Total: (E) (1955)–4075; G (1956)–344
II–27a. Evening branch of Cheliabinsk Polytechnical Institute in *Miass*
No divisions listed: 0501; 0502; 0513
II–27b. Evening branch of Cheliabinsk Polytechnical Institute in *Zlatoust'*
No divisions listed: 0303; 0401; 0408; 0501

III. INSTITUTES OF POWER AND ELECTRICAL ENGINEERING, RADIO-ENGINEERING, AND ENGINEERING-PHYSICS

III-1. *Ivanovok* Power Engineering Institute (of V.I. Lenin)
Advanced Degrees: none
IIt: 0305; 0306
IIIg: 0308
IIj: 0301; 0606
IIk: 0303; 0601
Evening
Total: E (1955)–2309; G (1955)–459
III–2. *Leningrad* Electrical Engineering Institute (of V.I. Ul'ianov [Lenin])
Advanced Degrees: none
IIuu: 0701; 0704
IIIb: 0606; 0608; 0609
IIm: 0303; 0613; 06XX
IIIc: 0611; 0612
III: 0604; 0610; 06YZ
Evening
Total: E (1956)–5815
III–3. *Moscow* Power Engineering Institute
Advanced Degrees: C; D
IIss: 0520; 0521; 0528; 0529
IIt: 0305; 0306; 0309; 06YY
IIIg: 0308
IIj: 0301; 0302
IIk: 0601; 0603; 0604
IIId: 0606; 0608; 0611; 0612; 0614; 06XZ
IIuu: 0701; 0704; 07XX
IIIf: 0303; 0602; 0613; 1605
IIIe: 0307; 1203
Evening
III–4. *Moscow* Physics and Engineering Institute (formerly Engineering-Physics Inst.)
Advanced Degrees: C; D
IIIh: no specialties listed
IIuu: no specialties listed
IIIaa: no specialties listed
IIIix: no specialties listed
III–5. *Novosibirsk* Electrical Engineering Institute
Advanced Degrees: none
IIuu: 03XX; 0604; 0701; 0704
IIk: 0301; 0303; 0501; 0601; 0608; 0611
Evening
III–6. *Riazan'* Radio Engineering Institute
Advanced Degrees: none
IIIa: 0704
IIIi: 0611
IIIj: 0606; 0608
Evening
Total: E (1956)–1997; G (1956)–18
III–7. *Taganrog* Radio Engineering Institute
Advanced Degrees: none
IIuu: 0701; 0704
IIId: 0611
IIIh: 03XX; 0608
Evening
Extension-Correspondence

IV. INSTITUTES OF MACHINE-BUILDING, SHIP-BUILDING, AVIATION ENGINEERING, PRINTING-PUBLISHING AND CINEMA ENGINEERING

A. *Machine Building, Machine Tool, Mechanical and Auto-Mechanical Institutes*

IV–1. Altai Institute of Agricultural Machinebuilding in *Barnaul*
Advanced Degrees: none
IVz: 0513; 0523
IVg: 0501; 0502; 0509
Evening
IV–1a. Evening branch of Altai Institute of Agricultural Machinebuilding in *Rubtsovsk*
No divisions listed: 0501; 0502; 0513
IV–2. *Briansk* Institute of Transportation Equipment Construction
Advanced Degrees: none
IVaa: 0504; 0512; 0521; 0526
IIaa: 0501; 0502
Evening
IV–4. *Zaporozh'e* Machine Construction Institute
Advanced Degrees: none
IIx: 0501
IIbbb: 0502; 0503
Evening
Extension-Correspondence
IV–5. *Izhevsk* Mechanical Institute
Advanced Degrees: none
IIaa: 0501; 0503; 0608

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Evening
Regular: E (1956)–1435; G (1956)–none
Evening: E (1956)–926; G (1956)–35

IV–5a. Evening branch of Izhevsk Mechanical Institute in *Votkinsk*:
No divisions listed: 0501

IV–6. *Leningrad* Mechanical Institute (formerly Leningrad Military Mechanical Engineering Institute)
Advanced Degrees: C; D
No divisions and specialties given
Evening

IV–7. *Leningrad* Institute of Precision Mechanics and Optics
Advanced Degrees: C; D
IItt: 0531; 0608; 0609
IVv: 0530
IIuu: 0606; 0704
Evening
Total: E (1956)–3727

IV–8. *Moscow* Automechanical Institute
Advanced Degrees: C; D
IVi: 0513; 0523
IIyy: 0501; 0502; 0503
Evening
Regular: E (1956)–3387

IV–9. *Moscow* Evening Machine Construction Institute
Advanced Degrees: none
IIaa: 0501
IVs: 0407; 0502; 0504
IIvx: 0531; 0608; 0611; 0701

IV–9a. Evening branch of Moscow Evening Machine Construction Institute in *Kolomna*
Advanced Degrees: none
IIaa: 0501; 0502
IVaa: 0523; 0526

IV–9b. Evening branch of Moscow Evening Machine Construction Institute in *Vladimir*:
IIaa: 0501; 0502; 0513
IIvx: 0531

IV–10. *Moscow* Engineering-physics Institute
Advanced Degrees: not known
IVyx: no specialties given
IVvx: no specialties given
IIqq: no specialties given
IVix: no specialties given

IV–11. *Moscow* Institute of Machine Tools (of I.V. Stalin)
Advanced Degrees: C; D
IIIh: 0531
IVp: 0501; 05YX
IIyy: 0501; 0502
IVm: 0503
Evening

IV–12. *Moscow* Higher Technical School (MVTU-Bauman Institute)
Advanced Degrees: C; D
IIaa: 0407; 0501; 0502; 0503; 0504
IVn: 0520; 0523; 0528; 0529
IVaa: 0510; 0526
IIIh: 0530; 0531; 0606; 0608; 0609; 0704
IIz: no specialties given
IIx: no specialties given
Evening
Regular: E (1956)–10,154

IV–13. *Omsk* Machinebuilding Institute
Advanced Degrees: none
IIaa: 0501
IVs: 0502; 0503
Evening
Total: E (1956)–1834

IV–14. *Perm'* Evening Machinebuilding Institute
Advanced Degrees: none
IIaa: 0501; 0502; 0503

IV–15. *Rostov-on-Don* Institute of Agricultural Machine Construction
Advanced Degrees: C
IVg: 0509
IVy: 0501
IIvx: 0531; 0606
IVs: 0502; 0503
IVbb: 0504
Evening
Extension-Correspondence

IV–16. *Stalingrad* Mechanical Institute
Advanced Degrees: none
IIx: 0501; 0513; 0523
IVo: 0502
Evening
Total: E (1955)–1560; G (1956)–180

IV–17. *Tula* Mechanical Institute
Advanced Degrees: C
IIaa: 0501; 0606
IVu: 0506
IIx: no specialties given
Evening

IV–17a. Evening branch of Tula Mechanical Institute in *Lipetsk*
No divisions listed: 0401; 0501; 0502; 0503

B. *Shipbuilding Institutes*

IV–18. *Leningrad* Shipbuilding Institute
Advanced Degrees: C; D
IIww: 0514
IIx: 0504; 0520; 0521; 0523; 0525
IVj: no specialties given
Evening
Total: E (1956)–4656

IV–19. *Nikolaev* Shipbuilding Institute (of Admiral S.O. Makarov)
Advanced Degrees: none
IIww: 0514
IIx: 0501; 0504; 0525
Evening

C. *Aviation Institutes*

IV–20. *Kazan'* Aviation Institute
Advanced Degrees: C; D
IVb: 05XX
IVd: 05XY
IIvx: 0609; 06XY
IIuu: 0608; 0704
Evening
Extension-Correspondence

IV–20a. Evening branch of Kazan' Aviation Institute in *Ioshkar-Ola*
No divisions given: 0501

IV–21. *Kuibyshev* Aviation Institute
Advanced Degrees: none
IVb: 05XX
IVd: 05XY; 1610
IVt: 0408; 0504
Evening

IV–22. *Leningrad* Institute of Aircraft Instrument Construction
Advanced Degrees: C
IVe: 0609; 06XY; 06XZ
IIuu: 0701; 0704
Evening

IV–23. *Moscow* Aviation Technological Institute
Advanced Degrees: C
IVf: 05XX; 05XY; 06XY; 0810
IVc: 0404; 0407; 0408; 0504
Evening

IV–24. *Moscow* Aviation Institute (of Sergo Ordzhonikidze)
Advanced Degrees: C; D
IVb: 05XX; 05YY
IVd: 05XY
IVl: 06YX
IIuu: 0608; 0701; 0704
IVe: 0609; 06XY; 06XZ
IIo: 1709
Evening

IV–25. *Ufa* Aviation Institute (of Sergo Ordzhonikidze)

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Advanced Degree: none
IVd: 05XY
IIaa: 0501
Evening

IV–26. *Khar'kov* Aviation Institute
Advanced Degrees: none
IVb: 05XX
IVd: 05XY
IVq: 1610

D. *Printing-Publishing Institutes*

IV–27. *Moscow* Printing-Publishing Institute
Advanced Degrees: C
IVw: 0515
IVx: 1109
IIo: 1712; 2220
Evening

IV–28. Ukrainian Printing-Publishing Institute (of Ivan Fedorov) in *L'vov*
Advanced Degrees: none
IIz: 0515; 1712
IIyy: 1109
Extension-Correspondence
Regular: E (1957)–1078
Ext/Cor. E (1957)–none

E. *Motion Picture Engineering Institutes*

IV–29. *Leningrad* Institute of Motion Picture Engineering
Advanced Degrees: C
IIm: 0615
IIz: 0533
IIf: 0813
Extension-Correspondence
Total: E (1956)–1085

V. GEOLOGICAL, MINING, PETROLEUM, PEAT, AND METALLURGICAL INSTITUTES

A. *Geological, Mining, Petroleum and Peat Engineering Institutes*

V–1. *Groznyi* Petroleum Engineering Institute
Advanced Degrees: none
IIr: 0103; 0105
IImm: 0205
IIyy: 0801
IIll: 0508; 0516
IIh: 1202
Extension-Correspondence
Total: E (1956)–4356

V–2. *Dnepropetrovsk* Mining Institute (of Artem)
Advanced Degrees: C
IIr: 0101; 0105; 0107; 0108
IIee: 0202
IIhh: 0204; 0304; 0506
Ve: 0201; 0206; 1705
Evening
Extension-Correspondence

V–2A. *Kalinin* Peat Engineering Institute:
Advanced Degrees: none
IIaa: 0203; 0802
IIv: 0104
IIz: 0501; 0507; 1604
Extension-Correspondence

V–3. *Karaganda* Polytechnical Institute (originally mining)
Advanced Degrees: none
IIee: 0201; 0202; 0206; 0304; 0506
Va: 0401; 0408
Vj: 1202; 1207
Evening
Extension-Correspondence

V–3a. Evening branch of Karaganda Polytechnical Institute in *Novo-Karaganda* Machinebuilding plant
No divisions listed: 0401; 0408; 0506

V–3b. Evening branch of Karaganda Polytechnical Institute in *Temir-Tau*
No divisions or specialties listed

V–4. *Kemerovo* Mining Institute
Advanced Degrees: none
IIee: 0202; 1705
Ve: 0206
Vg: 0304; 0506
IIfx: 0516; 0807; 0810; 1104
Evening
Extension-Correspondence

V–5. *Krivoi Rog* Mining-Metallurgical Institute
Advanced Degrees: none
IIr: 0101; 0201
IIee: 0202; 0206; 1202
Vg: 0204; 0303; 0304
Evening
Extension-Correspondence

V–5a. Evening branch of Krivoi Rog Mining-Metallurgical Institute in *Marganets*
Advanced Degrees: none
No divisions listed: 0202

V–6. *Leningrad* Mining Institute (of G.V. Plekhanov)
Advanced Degrees: C; D
IIr: 0101; 0107; 0108
IIee: 0202
Ve: 0206; 1705
Vc: 0105
Vg: 0304; 0506
Vf: 0201
IIbb: 0204; 0402; 1708
Evening
Total: E (1956)–4404

V–7. *Moscow* Geological Prospecting Institute (of Sergo Ordzhonikidze)
Advanced Degrees: C; D
IIr: 0101; 0102
Vc: 0105
Vd: 0107
Vb: 0108

V–8. *Moscow* Mining Institute (of I.V. Stalin)
Advanced Degrees: C; D
IIee: 0202
IIhh: 0204; 0304; 0506; 12XY; 16XY
Ve: 0201; 0206
IIo: 1705

V–9. *Moscow* Petroleum Engineering Institute (of academician I.M. Gubkin)
Advanced Degrees: C; D
IIr: 0103; 0105
IImm: 0205
IIll: 0508; 0516; 0607
IIyy: 0801
IIo: 1706
Extension-Correspondence

V–9a. Evening branch of Moscow Petroleum-Engineering Institute at Moscow Petroleum-Gas plant in *Liubertsy:* no divisions or specialties listed

V–9b. Evening branch of Moscow Petroleum-Engineering Institute at *Omsk* petroleum plant: no divisions or specialties listed

V–9c. Evening branch of Moscow Petroleum-Engineering Institute at *Salavat (Bashkir ASSR):* no divisions or specialties listed

V–9d. Evening branch of Moscow Petroleum-Engineering Institute at *Ishimbaevo (Bashkir ASSR):* no divisions or specialties listed

V–9e. Evening branch of Moscow Petroleum-Engineering Institute at *Al'met'evsk (Tatar ASSR):* no divisions or specialties listed

V–9f. Evening branch of Moscow Petroleum-Engineering Institute at *Bugul'm (Tatar ASSR):* no divisions or specialties listed

V–9g. Evening branch of Moscow Petroleum-Engineering Institute at *Leninogorsk (Tatar ASSR):* no divisions or specialties listed

V–11. *Perm'* Mining Institute
Advanced Degrees: none
IIee: 0202; 0506

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Vg: 0206; 0304; 1202
Extension-Correspondence

V–12. *Sverdlovsk* Mining Institute (of V.V. Vakhrushev)
Advanced Degrees: C; D
IIr: 0101; 0102; 0108
Vc: 0105
IIee: 0202
IIhh: 0204; 0304
Ve: 0201; 0206
Extension-Correspondence

V–13. *Tula* Mining Institute
Advanced Degrees: none
IIee: 0202; 0304; 0607
Ve: 0206; 1202
Evening

V–13a. Evening branch of Tula Mining Institute in *Stalinogorsk*
Advanced Degrees: none
No divisions listed: 0202; 0304

V–14. *Ufa* Petroleum Engineering Institute
Advanced Degrees: none
IImm: 0205
IIll: 0508
IIyy: 0801
Evening
Total: G (1956)–271

V–14a. Evening branch of Ufa Petroleum Engineering Institute in *Oktiabr'sk*
No divisions listed: 0205

V–15. *Khar'kov* Mining Institute
Advanced Degrees: C
IIee: 0202; 0204
Vg: 0304; 0506
Ve: 0206
Extension-Correspondence

V–15a. Evening branch of Khar'kov Mining Institute in *Kadievka*
No divisions listed: 0202; 0304

B. Metallurgical and Mining Metallurgical Institutes

V–16. *Voroshilovsk* Mining Metallurgical Institute
Advanced Degrees: none
IIee: 0202; 0303; 0304
IIbb: 0401; 0408
IIh: 1202
Evening

V–17. *Dnepropetrovsk* Metallurgical Institute (of I.V. Stalin)
Advanced Degrees: C; D
IIbb: 0401; 0403; 0404; 0405
IIz: 0505
IIyy: 0407; 0408
IIf: 0802; 0806
IIo: 1708
Evening
Extension-Correspondence

V–18. *Dneprodzerzhinsk* Evening Metallurgical Institute (of Arsenichev)
Advanced Degrees: none
IIbb: 0401; 0505
IIyy: 0408; 0802

V–19. *Irkutsk* Mining Metallurgical Institute
Advanced Degrees: C
IIr: 0101; 0105; 0108; 0201
IIee: 0202; 0304; 1202
IIbb: 0204; 0402; 0501
Evening
Extension-Correspondence
Total: E (1955)–2753; G (1955)–366

V–20. *Zhdanov* Metallurgical Institute
Advanced Degrees: none
IIbb: 0401; 0407; 0505
IIyy: 0408; 0504
Evening

V–21. Kazakh Mining Metallurgical Institute in *Alma-Ata*
Advanced Degrees: C
IIr: 0101; 0105; 0107; 0108; 0102
IIee: 0201; 0202; 1202
IIbb: 0402
Regular: E (1956)–1800

V–21A. *Krasnoiarsk* Institute of Non-ferrous Metals (of M.I. Kalinin)
Advanced Degrees: none
IIr: 0202; 0304
IIbb: 0204; 0402
IIyy: 0404; 0408

V–22. *Magnitogorsk* Mining-Metallurgical Institute (of G.I. Nosov)
Advanced Degrees: C
IIee: 0202; 0204; 0304
IIbb: 0401; 0407; 0408; 0505; 0802
IIh: 1202; 1207
Evening
Extension-Correspondence
Total: E (1955)–1809; G (1956)–184

V–22a. Evening branch of Magnitogorsk Mining Metallurgical Institute in *Beloretsk* (of G.I. Nosov)
No divisions listed: 0407; 0408

V–23. *Moscow* Evening Metallurgical Institute
Advanced Degrees: none
IIbb: 0401; 0403; 0404
IIyy: 0407; 0408; 0505

V–24. *Moscow* Steel Institute (of I.V. Stalin)
Advanced Degrees: C; D
IIbb: 0401; 0403; 0404
IIyy: 0407; 0408
Vi: 0405; 0406
Evening

V–24a. Evening branch of Moscow Steel Institute in *Lipetsk:*
No divisions listed: 0204; 0401; 0404; 0407; 0408

V–24b. Evening branch of Moscow Steel Institute in *Elektrostal'*
No divisions listed: 0401; 0501; 0502; 0503; 0505

V–26. Northern Caucasian Mining Metallurgical Institute in *Ordzhonikidze*
Advanced Degrees: none
IIgg: 0101; 0202
Vg: 0304; 1202
IIbb: 0204; 0402
Evening
Extension-Correspondence

V–27. Siberian Metallurgical Institute (of Sergo Ordzhonikidze) in *Stalinsk*
Advanced Degrees: C
IIee: 0202; 0304; 0506
IIbb: 0401; 0403; 0404; 0406
IIyy: 0407; 0408; 0505
IIh: 1202
Evening
Extension-Correspondence

VI. INSTITUTES OF CHEMICAL TECHNOLOGY

VI–1. *Dnepropetrovsk* Chemical Technology Institute (of F.E. Dzerzhinski)
Advanced Degrees: C
IIzz: 0803; 0805
IIxx: 0806
IIaaa: 0802; 0807; 0810; 0812
IIz: 0516; 0607
Evening
Extension-Correspondence

VI–2. *Ivanovo* Chemical Technology Institute
Advanced Degrees: C
IIzz: 0803; 0805
IIaaa: 0808; 0811; 1103; 1104
IIxx: 0806; 08XX
IIz: 0516
Evening
Total: E (1955)–2000; G (1955)–179

VI–3. *Kazan'* Chemical Technological Institute (of S.M. Kirov)
Advanced Degrees: C; D
IIyy: 0803; 0807; 0810; 1107

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IIz: 0516; 0529; 0607
IIkk: 0801
VIb: no specialties listed
Evening
Extension-Correspondence
Regular E (1956)–672

VI–4. Kazakh Technological Institute in *Chimkent*
Advanced Degrees: none
IIyy: 0803; 0805; 0806; 0810
IIf: 1001; 1009
IIz: 0516; 0529; 0517
IIh: 1202; 1205; 1207; 1209
Evening

VI–4a. Evening branch of Kazakh Technological Institute in *Dzhambul*
No divisions listed: 0516; 0803; 1009; 1106; 1207

VI–5. *Leningrad* Technological Institute
Advanced Degrees: none
IIyy: 0904
IIz: 0308; 0516
IIo: 1720
Evening
Extension-Correspondence

VI–6. *Leningrad* Technological Institute (of Lensovet)
Advanced Degrees: C; D
IIzz: 0803; 0804; 0805
IIaaa: 0802; 0807; 0808; 0810; 0811; 0812
IIxx: 0806
IIz: 0516; 0607
VIb: no specialties listed
VIf: no specialties listed
Evening
Extension-Correspondence
Total: E (1956)–4392

VI–7. *Moscow* Chemical Technology Institute (of D.I. Mendeleev)
Advanced Degrees: C; D
IIaaa: 0808; 0810; 0811
IIzz: 0803; 0805
VId: 0802
IIxx: 0806; 08XX
VIb: no specialties listed
VIf: 0804; 08XY
Evening
Regular: E (1956)–3949

VI–8. *Moscow* Institute of Fine Chemistry Technology (of M.V. Lomonosov)
Advanced Degrees: C; D
VIg: 0812
VIa: 0802; 0807
VIc: 0804; 0809
Evening

VI–9. *Moscow* Institute of Chemical Machinebuilding
Advanced Degrees: C; D
VIe: 0516; 0529; 0607
VIex: 0516
IIx: 0516; 0607
IIrr: 0308
Evening

VI–10. *Iaroslavl'* Technological Institute
Advanced Degrees: none
IIyy: 0807; 0811; 0812
IIz: 0516; 0607
Evening
Total: E (1956)–1138

VII. FOOD TECHNOLOGY AND FISH INDUSTRY INSTITUTES

A. Institutes of Food Technology

VII–1A. *Voronezh* Technological Institute
Advanced Degrees: none
IIyy: 1002; 1003; 1004
IIz: 0516; 0517; 0607
IIfx: 0807; 0810; 0812
Evening
Extension-Correspondence

VII–1. *Kiev* Technological Institute of Food Industry
Advanced Degrees: C; D
IIyy: 1002; 1003; 1004
IIz: 0308; 0517
Extension-Correspondence

VII–2. *Krasnodar* Institute of Food Industry
Advanced Degrees: C
IIyy: 1001; 1003; 1004; 1005; 1006; 1007; 1008; 0810
IIz: 0517
Evening
Extension-Correspondence

VII–4. *Leningrad* Technological Institute of the Refrigeration Industry
Advanced Degrees: C; D
VIIf: 0529
IIz: 0517
IIyy: 1009
Evening

VII–5. *Moscow* Technological Institute of Food Industry
Advanced Degrees: C; D
VIId: 1001
VIIa: 1002; 1003; 1005
IIz: 0517; 0607
IIo: 1718
Evening

VII–6. *Moscow* Technological Institute of Meat and Dairy Industries
Advanced Degrees: C; D
IIyy: 0810; 1009
IIz: 0517
IIo: 1718
VIIg: 1507
Evening
Extension-Correspondence

VII–7. *Odessa* Technological Institute (of I.V. Stalin)
Advanced Degrees: C
IIyy: 1001
IIz: 0517
IIo: 1718
Evening

VII–8. *Odessa* Technological Institute of Food and Refrigeration Industry
Advanced Degrees: C
IIyy: 1005; 1007; 1009
IIz: 0517
VIIe: 0529
Evening
Extension-Correspondence

B. Institutes of Fish Industry

VII–9. *Astrakhan'* Institute of Fishery and Fish Technology Industry
Advanced Degrees: none
IIyy: 1009; 1010
VIIc: 1012; 1013
IIz: 0517; 0525; 0529; 0606
Extension-Correspondence
Total: E (1957)–1779; G (1957)–134

VII–10. Far-Eastern Institute of Fishery and Fish Technology Industry in *Vladivostok*
Advanced Degrees: none
IIyy: 0810; 1002; 1007; 1009; 1010
VIIc: 1012
IIz: 0517; 0529
Extension-Correspondence

VII–11A. *Kaliningrad* Technological Institute of Fish Industry
Advanced Degrees: none
VIIc: 1010; 1012
VIIb: 1013
IIww: 0514; 0525
IIz: 0517; 0529
IIyy: 1009

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Evening
Extension-Correspondence

VIII. INSTITUTES OF LIGHT INDUSTRY

A. Institutes of Light Industry

VIII–1. *Kiev* Technological Institute of Light Industry
Advanced Degrees: none
IIf: 1104; 1106
IIyy: 1102; 1105; 1108
IIz: 0518
IIo: 1714
Evening
Extension-Correspondence

VIII–2. *Moscow* Technological Institute of Light Industry
Advanced Degree: none
IIf: 1106; 1107
IIyy: 1105; 1108
IIz: 0518; 0606
IIo: 1714
Evening

VIII–2a. Evening branch of Moscow Technological Institute of Light Industry in *Podol'sk*
No divisions listed: 0501; 0518

B. Textile Institutes

VIII–3. *Ivanovo* Textile Institute
Advanced Degrees: none
IIyy: 1102; 1105
IIz: 0308; 0518
Evening
Extension-Correspondence
Total: E (1955)–1959; G (1955)–146

VIII–4. *Kostroma* Textile Institute
Advanced Degrees: none
IIyy: 0902; 1102; 1105
IIz: 0518; 0519; 1101
Evening
Extension-Correspondence
Total: E (1955)–1431

VIII–5. *Leningrad* Textile Institute (of S.M. Kirov)
Advanced Degrees: C
IIyy: 1102
VIIIb: 1105
IIz: 0518
IIf: 1103; 1104
IIo: 1714
Evening
Total: E (1956)–3171

VIII–6. *Moscow* Textile Institute
Advanced Degrees: C; D
IIyy: 1102
IIz: 0518; 0606
IIf: 1103; 1104
VIIIa: 2227
IIo: 1714
Evening
Regular E: (1956)–3159

VIII–6a. Evening branch of Moscow Textile Institute in *Pavlovo-Posada*
No divisions listed: 0518; 1102; 1103; 1714

VIII–7. *Tashkent* Textile Institute
Advanced Degrees: C
IIyy: 0518; 0807; 1101; 1102; 1104; 1105
IIo: 1714
Evening
Extension-Correspondence

IX. CONSTRUCTION, GEODESY, AND ROAD BUILDING INSTITUTES

A. Construction (Civil Engineering) Engineering Institutes

IX–1. *Voronezh* Construction Engineering Institute
Advanced Degrees: None
IIh: 1202
IXd: 0902; 1207
Evening
Extension-Correspondence

IX–2. *Gor'kii* Construction Engineering Institute
Advanced Degrees: C
IIh: 1202
IXi: 1208; 1209
Evening
Extension-Correspondence

IX–3. *Dnepropetrovsk* Construction Engineering Institute
Advanced Degrees: none
IIh: 1202; 1207
IIz: 0511
Evening
Extension-Correspondence

IX–3a. Evening branch of Dnepropetrovsk Construction Engineering Institute in *Zaporozh'e*
No divisions listed: 1202

IX–4. *Irkutsk* Construction Engineering Institute
Advanced Degrees: none
No divisions listed: 1202; 1207

IX–5. *Kazan'* Construction Engineering Institute
Advanced Degrees: none
IIh: 1202
IXd: 1207
Evening

IX–6. *Kiev* Construction Engineering Institute
Advanced Degrees: C; D
IXa: 1201
IIh: 1202
IXd: 1207
IXj: 1206; 1301
IXi: 1208; 1209
Evening
Extension-Correspondence

IX–7. *Kuibyshev* Construction-Engineering Institute (of A.I. Mikoian)
Advanced Degrees: none
IIh: 1202; 1203; 1207
IXi: 1208; 1209
Evening
Extension-Correspondence

IX–8. *Leningrad* Construction Engineering Institute
Advanced Degrees: C; D
IXa: 1201
IIh: 1202
IXj: 1206
IXi: 1208; 1209
IIz: 0511
IXg: 1211
Evening
Total: E (1956)–4197

IX–9. *Moscow* Construction Engineering Institute (of V.V. Kuibyshev)
Advanced Degrees: C; D
IIh: 1202
IIv: 1203; 1204
IXl: 1209
IXe: 1208
IXd: 1207
IXj: 1206
IIz: 0511
Regular: E (1956)–3262

IX–10. *Moscow* Engineering Institute of Urban Construction and City Planning (under the jurisdiction of the Moscow City Council)
Advanced Degrees: C
IXj: 1202
IXl: 1209; 1211
IXe: 1208
IXd: 1207
IIz: 0511
Evening

IX–11. *Novosibirsk* Engineering Construction Institute (of V.V. Kuibyshev)
Advanced Degrees: C

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IXa: 1201
IIv: 1203; 1208; 1209
IIh: 1202; 1207
Evening
Extension-Correspondence

IX–12. *Odessa* Engineering Construction Institute
Advanced Degrees: C
IIv: 1203
IIh: 1202; 1207
IXi: 1208; 1209
Evening
Extension-Correspondence

IX–12a. Evening branch of Odessa Engineering Construction Institute in *Novaia Kakhovka*
No divisions listed: 1202

IX–13. *Penza* Construction Engineering Institute
Advanced Degrees: none
IIh: 1202
IIyy: 1207
IXi: 1208; 1209
Evening
Extension-Correspondence

IX–14. *Poltava* Engineering Institute of Rural Construction
Advanced Degrees: none
IIh: 1202
IXi: 1208; 1209
Extension-Correspondence

IX–15. *Rostov* Construction Engineering Institute
Advanced Degrees: none
IIh: 1202; 1210
IXd: 1207
Evening
Extension-Correspondence

IX–16. *Stalingrad* Engineering Institute of Urban Construction
Advanced Degrees: none
IIh: 1206
IXi: 1208; 1209
IXg: 1211
Evening
Total: E (1955)–1407; G (1956)–none

IX–17. *Tomsk* Construction Engineering Institute
Advanced Degrees: none
IIh: 0511; 1202
IIv: 1203
IXg: 1211
Evening
Total: E (1956)–1444; G (1956)–65

IX–17A. *Ust'-Kamenogorsk* Road Construction Institute
Advanced Degrees: None
IIh: 1202
IXg: 1211; 1609
Evening

IX–18. *Khar'kov* Construction Engineering Institute
Advanced Degrees: C
IIh: 1202
IXi: 1208; 1209
Evening
Extension-Correspondence

IX–19. *Khar'kov* Engineering Institute of Communal Construction
Advanced Degrees: none
IIh: 1206
IXk: 1605
IIo: 1721; 1722
Evening
Extension-Correspondence

B. Geodesy Institutes

IX–20. *Moscow* Engineering Institute of Geodesy, Aerial Photography and Cartography
Advanced Degrees: C; D
IXf: 1301; 1302
IXb: 1303
IXh: 0530
IXc: 1304
Extension-Correspondence

IX–21. *Novosibirsk* Engineering Institute of Geodesy, Aerial Photography and Cartography
Advanced Degrees: none
IXf: 1301; 1302
IXc: 1303; 1304

C. Highway Engineering and Automotive Transport Institutes

IX–22. *Kiev* Highway Engineering-Automotive Transport Institute
Advanced Degrees: C
IXg: 1211
IIz: 1609
Evening
Extension-Correspondence

IX–23. *Moscow* Highway Engineering-Automotive Transport Institute
Advanced Degrees: C; D
IXg: 1211; 1212; 1213
IIz: 0511; 1609
Evening

IX–24. *Saratov* Highway Engineering-Automotive Transport Institute
Advanced Degrees: none
IXg: 1211; 1212
IIh: 1202; 1208
IXbx: 1609
IIz: 0308; 0501; 0511; 0609
Evening

IX–25. Siberian Highway Engineering-Automotive Transport Institute in *Omsk*
Advanced Degrees: none
IXg: 1211
IIz: 0511; 1609
Evening
Extension-Correspondence
Total: E (1956)–1797

IX–26. *Khabarovsk* Highway Engineering-Automotive Transport Institute
Advanced Degrees: none
IXg: 1211
IXbx: 1609
IIz: 0511
IIh: 1202

IX–27. *Khar'kov* Highway Engineering-Automotive Transport Institute
Advanced Degrees: C
IXg: 1211
IIz: 0511
IXbx: 1609
Evening
Extension-Correspondence

X. INSTITUTES OF HYDRO-METEOROLOGY

X–1. *Leningrad* Institute of Hydro-Meteorology
Advanced Degrees: none
Xb: 1404
Xa: 1401; 1402
Evening
Extension-Correspondence

X–2. *Odessa* Institute of Hydro-Meteorology
Advanced Degrees: none
Xb: 1404; 1405
Xa: 1401
Extension-Correspondence

XI. TRANSPORT AND COMMUNICATION INSTITUTES

A. Railroad Transport Institutes

XI–1. Belorussian Engineering Institute of Railway Transport in *Gomel'*
Advanced Degrees: none
IIz: 0526
XIj: 1604

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IIh: 1210
XIg: 1202
Evening
Extension-Correspondence

XI–2. *Dnepropetrovsk* Engineering Institute of Railway Transport
Advanced Degrees: C
IIz: 0512
XIe: 1602
XIj: 1604
IIh: 1210
XIg: 1202
Evening
Extension-Correspondence

XI–3. *Leningrad* Engineering Institute of Railway Transport
Advanced Degrees: C, D
IIz: 0511; 0512; 0526
IIrr: 1602
IIm: 1603
XIj: 1604
IIh: 1209; 1210
XIb: 1212
Evening
Extension-Correspondence
Total: E (1956)–6798

XI–4. *Moscow* Engineering Institute of Railway Transport (of I.V. Stalin)
Advanced Degrees: C, D
IIz: 0512; 0526
IIrr: 0305; 0606
XIe: 1602
XIj: 1604
IIh: 1210
XIg: 1202
XIb: 1212
XId: 1723
Evening
Regular: E (1956)–6730

XI–5. *Novosibirsk* Engineering Institute of Railway Transport
Advanced Degrees: none
XIj: 1604
IIh: 1210
XIg: 1202
XIb: 1212
Evening
Extension-Correspondence

XI–7. *Rostov* Engineering Institute of Railway Transport
Advanced Degrees: none
IIz: 0512; 0526
IIrr: 0305; 1602
XIj: 1604
IIh: 0511
Evening
Extension-Correspondence

XI–8. *Tashkent* Engineering Institute of Railway Transport
Advanced Degrees: none
IIz: 0512; 0526; 1603
XIj: 1604
IIh: 1210
XIg: 1202
XId: 1723
Evening
Extension-Correspondence

XI–9. *Tbilisi* Engineering Institute of Railway Transport (of V.I. Lenin)
Advanced Degrees: C
XIe: 1602
IIh: 0511; 1210
Evening
Extension-Correspondence

XI–10. *Tomsk* Electromechanical Engineering Institute of Railway Transport
Advanced Degrees: none
IIz: 0512; 0526
XIe: 1602
IIm: 1603
Total: E (1956)–1809; G (1956)–244

XI–11. Ural Electromechanical Engineering Institute of Railway Transport in *Sverdlovsk*
Advanced Degrees: none
IIm: 1603
XIe: 1602
Evening

XI–12. *Khabarovsk* Engineering Institute of Railway Transport
Advanced Degrees: none
IIz: 0512; 0526; 1602
XIj: 1604
IIh: 1202; 1210
Evening
Extension-Correspondence

XI–13. *Khar'kov* Engineering Institute of Railway Transport
Advanced Degrees: C
IIz: 0526
XIj: 1603; 1604
IIh: 1210
XId: 1723
Evening
Extension-Correspondence

B. Institutes of River Transport

XI–14. *Gor'kii* Engineering Institute of River Transport (under the jurisdiction of the Ministry of River Fleets of the RSFSR)
Advanced Degrees: C, D
IIww: 0514
XIl: 1607; 1608
XIm: 0524
Extension-Correspondence

XI–15. *Leningrad* Engineering Institute of River Transport (under the jurisdiction of the Ministry of River Fleets of the RSFSR)
Advanced Degrees: C, D
IIv: 1204
IIww: 0524
XIm: 0524
IIk: 0303
XIf: 0510
IIo: 1724
Extension-Correspondence
Evening

XI–16. *Novosibirsk* Engineering Institute of River Transport (under the jurisdiction of the Ministry of River Fleets of the RSFSR)
Advanced Degrees: none
IIv: 1204
XIl: 1607; 1608
XIm: 0524
Extension-Correspondence
Evening

XI–17. *Odessa* Engineering Institute of Maritime Fleet (under the jurisdiction of the Ministry of the Maritime Fleet of the U.S.S.R.)
Advanced Degrees: none
IIv: 1204
IIww: 0514
XIm: 0524
XIj: 1608
XIi: 0510
Evening
Extension-Correspondence

C. Higher Maritime Schools

XI–18. *Vladivostok* Higher Maritime School (under the jurisdiction of the Ministry of the Martime Fleet of the U.S.S.R.)
Advanced Degrees: none
XIh: 1606
XIm: 0525
Extension-Correspondence

XI–19. *Leningrad* Higher Engineering Maritime School (of

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admiral S.O. Makarov) (under the jurisdiction of the Ministry of the Maritime Fleet of the U.S.S.R.)
Advanced Degrees: C, D
XIa: 1402; 1403
XIh: 1606
XIm: 0525
IIuu: 0701
IIk: 06XX
Extension-Correspondence

XI–20. *Murmansk* Higher Maritime School
Advanced Degrees: none
XIh: 1606
XIm: 0514; 0525

XI–21. *Odessa* Higher Maritime School (under the jurisdiction of the Ministry of the Maritime Fleet of the U.S.S.R.)
Advanced Degrees: none
XIh: 1606
XIm: 0525
IIk: 06XX
Extension-Correspondence

D. Institutes of Civil Aeronautics (under the Main Administration of Civil Aeronautics of the Council of Ministers of the U.S.S.R.)

XI–22. *Kiev* Institute of Civil Aeronautics (of K.E. Voroshilov)
Advanced Degrees: none
IIz: 1610
IIk: 07YZ; 07ZY; 16XX
Extension-Correspondence

E. Institutes of Communications (under the jurisdiction of the Ministry of Communication of the U.S.S.R.)

XI–23. *Kuibyshev* Electrotechnical Communications Institute
Advanced Degrees: none
XIk: 0703
Extension-Correspondence

XI–24. *Leningrad* Electrotechnical Communications Institute (of M.A. Bonch-Bruevich)
Advanced Degrees: C
XIk: 0703; 0702
Evening
Extension-Correspondence

XI–25. *Moscow* Electrotechnical Communications Institute
Advanced Degrees: C, D
XIk: 0703
XIn: 0702
IIuu: 0701
XIax: 0606
IIo: 07ZX
Evening
Regular: E (1956)–3730

XI–26. *Novosibirsk* Electrotechnical Communications Institute
Advanced Degrees: none
XIk: 0703
XIn: 0702
IIo: 1728
Evening
Extension-Correspondence

XI–27. *Odessa* Electrotechnical Communications Institute
Advanced Degrees: none
XIk: 0703
XIn: 0702
Evening
Extension-Correspondence

XI–28. *Tashkent* Electrotechnical Communications Institute
Advanced Degrees: none
XIk: 0703
XIn: 0702
Evening
Extension-Correspondence

XII. AGRICULTURAL AND FORESTRY INSTITUTES

A. Agricultural Institutes •

XII–1. Azerbaidzhan Agricultural Institute in *Kirovobad*
Advanced Degrees: C
1501; 1503; 1506; 1507; 1509
Extension-Correspondence

XII–2. Azov-Black Sea Agricultural Institute in *Persianovka*
Advanced Degrees: none
1502
Extension-Correspondence

XII–3. *Akmolinsk* Agricultural Institute
Advanced Degrees: none
1502; 1508; 1509
Extension-Correspondence

XII–4. Altai Agricultural Institute in *Barnaul*
Advanced Degrees: none
1502; 1506; 1509
Extension-Correspondence

XII–5. Armenian Agricultural Institute in *Erevan*
Advanced Degrees: C
1502; 1503; 1509
Extension-Correspondence

XII–6. Bashkir Agricultural Institute in *Ufa*
Advanced Degrees: C
1502; 1506; 1507; 1509
Extension-Correspondence

XII–7. Belorussian Agricultural Academy in *Gorki* (Mogilev region)
Advanced Degrees: C
1501; 1502; 1506; 1507; 1508; 1509; 1511; 1715; 1737
Extension-Correspondence

XII–8. *Belotserkov'* Agricultural Institute
Advanced Degrees: C
1502; 1506; 1507
Extension-Correspondence

XII–9. *Blagoveshchensk* Agricultural Institute
Advanced Degrees: none
1502; 1506; 1509
Extension-Correspondence

XII–10. *Velikie Luki* Agricultural Institute
Advanced Degrees: C; D
1502; 1506
Extension-Correspondence

XII–11. *Voronezh* Agricultural Institute
Advanced Degrees: none
1502; 1508; 1509; 1715; 1737
Extension-Correspondence

XII–12. *Gor'kii* Agricultural Institute
Advanced Degrees: C
1502; 1506; 1509
Extension-Correspondence

XII–13. *Grodno* Agricultural Institute
Advanced Degrees: none
1502; 1506
Extension-Correspondence

XII–14. Georgian Agricultural Institute in *Tbilisi*
Advanced Degrees: C; D
1502; 1503; 1509; 1512; 1715; 1737
Extension-Correspondence

XII–15. Dagestan Agricultural Institute in *Makhach-Kala*
Advanced Degrees: none
1502; 1506; 1507
Extension-Correspondence

XII–16. *Dnepropetrovsk* Agricultural Institute
Advanced Degrees: none
1502; 1509
Extension-Correspondence

XII–17. *Zhitomir* Agricultural Institute
Advanced Degrees: none
1502
Extension-Correspondence

XII–18. *Ivanovo* Agricultural Institute
Advanced Degrees: none

• As a rule, in agricultural institutes, individual specialties are not grouped under divisions.

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1502; 1506
Extension-Correspondence
Total: E (1955)–955; G (1955)–199

XII–19. *Izhevsk* Agricultural Institute
Advanced Degrees: none
1502; 1506; 1509
Extension-Correspondence
Regular: E (1956)–1011; G (1956)–124
Ext./Cor.: E (1956)–290; G (1956)–none

XII–20. *Irkutsk* Agricultural Institute
Advanced Degrees: C
1502; 1506; 1509
Extension-Correspondence
Total: E (1955)–1575; G (1955)–366

XII–21. *Kazan'* Agricultural Institute (of M. Gor'kii)
Advanced Degrees: none
1502; 1509
Extension-Correspondence

XII–22. Kazakh Agricultural Institute in *Alma-Ata*
Advanced Degrees: C
1502; 1509; 1510; 1511; 1512
Extension-Correspondence
Regular: E (1956)–2761

XII–23. *Kamenets-Podol'sk* Agricultural Institute
Advanced Degrees: none
1502; 1506
Extension-Correspondence

XII–24. Kirgiz Agricultural Institute (of K.I. Skriabin) in *Frunze*
Advanced Degrees: C
1502; 1506; 1507; 1509
Extension-Correspondence

XII–25. *Kirov* Agricultural Institute
Advanced Degrees: none
1502; 1506; 1507; 1509
Extension-Correspondence
Regular: E (1956)–1604

XII–26. *Kishinev* Agricultural Institute (of M.V. Frunze)
Advanced Degrees: C
1502; 1503; 1506; 1509
Extension-Correspondence

XII–27. *Kostroma* Agricultural Institute
Advanced Degrees: none
1502; 1506; 1509
Extension-Correspondence
Total: E (1955)–1135

XII–28. *Krasnoiarsk* Agricultural Institute
Advanced Degrees: none
1502; 1506; 1509
Extension-Correspondence
Total: E (1956)–886; G (1956)–none

XII–29. Crimean Agricultural Institute (of M.I. Kalinin) in *Simferopol'*
Advanced Degrees: none
1502; 1503
Extension-Correspondence

XII–30. Kuban' Agricultural Institute in *Krasnodar*
Advanced Degrees: C
1502; 1503; 1506; 1509
Extension-Correspondence

XII–31. *Kuibyshev* Agricultural Institute
Advanced Degrees: none
1502; 1509; 1512
Extension-Correspondence
Regular: E (1956)–1400; G (1956)–404
Ext./Cor.: E (1956)–300; G (1956)–116

XII–32. *Kurgan* Agricultural Institute
Advanced Degrees: none
1502; 1506
Extension-Correspondence
Total: E (1956)–1701

XII–33. *Kursk* Agricultural Institute
Advanced Degrees: none
1502; 1506
Extension-Correspondence

XII–34. *Kutaisi* Agricultural Institute
Advanced Degrees: none
1008; 1502; 1505
Extension-Correspondence

XII–35. Latvian Agricultural Institute in *Riga*
Advanced Degrees: C; D
0901; 0902; 1502; 1506; 1507; 1508; 1509; 1511; 1512
Extension-Correspondence
Total: E (1955)–5200

XII–36. *Leningrad* Agricultural Institute
Advanced Degrees: C; D
1502; 1503; 1504; 1506; 1509; 1510; 1715; 1737
Extension-Correspondence
Total: E (1956)–3092

XII–37. Lithuanian Agricultural Academy in *Kaunas*
Advanced Degrees: C
1502; 1509; 1511; 1512; 1715; 1737
Extension-Correspondence
Total: E (1956)–1917; G (1956)–288

XII–38. *L'vov* Agricultural Institute
Advanced Degrees: none
1502; 1508; 1509; 1715; 1737
Extension-Correspondence
Regular: E (1957)–2016
Ext. Cor: E (1957)–1206

XII–39. *Lugansk* Agricultural Institute
Advanced Degrees: none
1502
Extension-Correspondence

XII–40. *Michurinsk* Vegetable-Fruit Institute (of I.V. Michurin)
Advanced Degrees: C
1502; 1503
Extension-Correspondence

XII–41. *Moscow* Agricultural Academy (of K.A. Timiriazev)
Advanced Degrees: C; D
1501; 1502; 1503; 1504; 1506; 1715; 1737
Extension-Correspondence
Regular: E (1956)–3185

XII–42. *Novosibirsk* Agricultural Institute
Advanced Degrees: none
1502; 1506; 1509
Extension-Correspondence

XII–43. *Odessa* Agricultural Institute
Advanced Degrees: C
1502; 1503; 1506
Extension-Correspondence

XII–44. *Omsk* Agricultural Institute (of S.M. Kirov)
Advanced Degrees: C; D
1009; 1301; 1502; 1503; 1506; 1508; 1509; 1511; 1715; 1737
Extension-Correspondence
Total: E (1956)–4658

XII–45. *Orenburg* Agricultural Institute (of A.A. Andreev)
Advanced Degrees: none
1502; 1506; 1507; 1509
Extension-Correspondence

XII–46. *Penza* Agricultural Institute
Advanced Degrees: none
1502; 1506; 1509
Extension-Correspondence
Regular: (E)–1956–1601; G (1956)–138
Ext. Cor.: E (1956)–257; G (1956)–none

XII–47. *Perm'* Agricultural Institute (of Academician D.N. Prianishnikov)
Advanced Degrees: C
1501; 1502; 1506; 1509
Extension-Correspondence

XII–48. *Poltava* Agricultural Institute
Advanced Degrees: none
1502; 1506
Extension-Correspondence

XII–49. Primor'e Agricultural Institute in *Ussuriisk*
Advanced Degrees: none
1502; 1506; 1512
Extension-Correspondence

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XII–50. *Riazan'* Agricultural Institute (of Prof. P.A. Kostychev)
Advanced Degrees: none
1502; 1506; 1509
Extension-Correspondence
Total: E (1956)–1173; G (1956)–223

XII–51. *Saratov* Agricultural Institute
Advanced Degrees: C
1502; 1512; 1715; 1737
Extension-Correspondence

XII–52. *Sverdlovsk* Agricultural Institute
Advanced Degrees: none
1502; 1506; 1509
Extension-Correspondence

XII–53. North-Osetin Agricultural Institute in *Ordzhonikidze*
Advanced Degrees: C
1502; 1506; 1509
Extension-Correspondence

XII–54. *Stavropol'* Agricultural Institute
Advanced Degrees: C
1502; 1506; 1507; 1509
Extension-Correspondence

XII–55. *Stalingrad* Agricultural Institute
Advanced Degrees: C
1502; 1506; 1509; 1510
Extension-Correspondence
Total: E (1955)–3244; G (1956)–312

XII–56. Tadzhik Agricultural Institute in *Stalinabad*
Advanced Degrees: none
1502; 1506; 1509
Extension-Correspondence

XII–57. *Tashkent* Agricultural Institute
Advanced Degrees: C; D
1502; 1503; 1504; 1505; 1715; 1737
Extension-Correspondence

XII–58. Turkmenian Agricultural Institute (of M.I. Kalinin) in *Ashkhabad*
Advanced Degrees: C
1502; 1505; 1506; 1507; 1509
Extension-Correspondence
Regular: E (1956)–2692
Ext. Cor.: E (1956)–705

XII–59. Uzbek Agricultural Institute (of V.V. Kuibyshev) in *Samarkand*
Advanced Degrees: C
1502; 1506; 1507
Extension-Correspondence

XII–60. Ukrainian Agricultural Academy in *Kiev*
Advanced Degrees: C; D
1501; 1502; 1506; 1507; 1509; 1510; 1512; 1716; 1737

XII–61. *Ul'ianovsk* Agricultural Institute
Advanced Degrees: none
1502; 1506; 1507; 1509
Extension-Correspondence

XII–62. *Uman'* Agricultural Institute
Advanced Degrees: none
1502; 1503
Extension-Correspondence

XII–63. *Khar'kov* Agricultural Institute (of V.V. Dokuchaev)
Advanced Degrees: C; D
1501; 1502; 1504; 1508; 1715; 1737
Extension-Correspondence

XII–64. *Kherson* Agricultural Institute (of A.D. Tsiurupa)
Advanced Degrees: none
1502; 1506
Extension-Correspondence

XII–65. Chuvash Agricultural Institute in *Cheboksary*
Advanced Degrees: none
1502; 1506
Extension-Correspondence

XII–66. Estonian Agricultural Academy in *Tartu*
Advanced Degrees: C
1502; 1506; 1507; 1509; 1511; 1512
Extension-Correspondence
Total: E (1956)–2476

B. Zootechnical, Dairy and Veterinarian Institutes

XII–67. *Alma-Ata* Zooveterinarian Institute
Advanced Degrees: C; D
1506; 1507
Extension-Correspondence
Total: E (1956)–1455; G (1956)–74

XII–68. Buriat-Mongol Zooveterinarian Institute in *Ulan-Ude*
Advanced Degrees: none
1009; 1106; 1202; 1205; 1502; 1506; 1507
Extension-Correspondence

XII–69. *Vologda* Dairy Institute
Advanced Degrees: none
1009; 1506; 1509
Extension-Correspondence

XII–70. *Voronezh* Zooveterinarian Institute
Advanced Degrees: none
1506; 1507
Extension-Correspondence

XII–71. *Vitebsk* Veterinarian Institute
Advanced Degrees: none
1506; 1507
Extension-Correspondence

XII–72. Georgian Zooveterinarian Institute in *Tbilisi*
Advanced Degrees: none
1506; 1507
Extension-Correspondence

XII–73. *Erevan* Zooveterinarian Institute
Advanced Degrees: C; D
1506; 1507
Extension-Correspondence

XII–74. *Kazan'* Veterinarian Institute (of N.E. Bauman)
Advanced Degrees: C; D
1506; 1507
Extension-Correspondence

XII–75. All-Union Institute for Improvement of Veterinary Physicians in *Leningrad*
Advanced Degrees: C; D
1507
Extension-Correspondence

XII–76. Lithuanian Veterinarian Academy in *Kaunas*
Advanced Degrees: none
1506; 1507
Extension-Correspondence
Total: E (1956)–740; G (1956)–128

XII–77. *L'vov* Zooveterinarian Institute
Advanced Degrees: C
1506; 1507
Extension-Correspondence
Regular: E (1957)–905
Ext. Cor.: E (1957)–275

XII–78. *Moscow* Veterinarian Academy
Advanced Degrees: C; D
1506; 1507
Extension-Correspondence

XII–79. *Novocherkassk* Zooveterinarian Institute (of the First Cavalry Army)
Advanced Degrees: C
1506; 1507
Extension-Correspondence

XII–80. *Omsk* Veterinarian Institute
Advanced Degrees: C; D
1507
Extension-Correspondence
Total: E (1956)–1093

XII–81. *Saratov* Veterinarian Institute
Advanced Degrees: C
1506; 1507
Extension-Correspondence

XII–82. *Semipalatinsk* Zooveterinarian Institute
Advanced Degrees: none
1506; 1507
Extension-Correspondence
Regular: E (1956)–1242

XII–83. *Troitsk* Veterinarian Institute
Advanced Degrees: none
1506; 1507

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Extension-Correspondence
Total: E (1955)–848; G (1956)–108

XII–84. *Khar'kov* Veterinarian Institute
Advanced Degrees: C; D
1507
Extension-Correspondence

XII–85. *Khar'kov* Zootechnical Institute
Advanced Degrees: none
1506
Extension-Correspondence

C. *Institute for the Mechanization and Electrification of Agriculture*

XII–86. Azov-Black Sea Regional Institute of Mechanization and Electrification of Agriculture in *Zernovoi*
Advanced Degrees: none
1509
Extension-Correspondence

XII–87. Belorussian Institute of Mechanization of Agriculture in *Minsk*
Advanced Degrees: none
1509; 1510
Extension-Correspondence

XII–88. *Melitopol'* Institute of Mechanization of Agriculture
Advanced Degrees: none
1509
Extension-Correspondence

XII–89. *Moscow* Institute of Mechanization and Electrification of Agriculture
Advanced Degrees: C; D
1509; 1510

XII–90. *Saratov* Institute of Mechanization of Agriculture (of M.I. Kalinin)
Advanced Degrees: none
1509; 1510
Extension-Correspondence

XII–91. *Khar'kov* Institute of Mechanization of Agriculture
Advanced Degrees: none
1509; 1510
Extension-Correspondence

XII–92. *Cheliabinsk* Institute of Mechanization and Electrification of Agriculture
Advanced Degrees: C
1509; 1510
Extension-Correspondence
Total: E (1955)–2550; G (1956)–405

D. *Hydromelioration and Land-Conservation Institutes*

XII–93. *Kiev* Engineering Institute of Water Supply and Irrigation
Advanced Degrees: C
0203; 1203; 1511
Extension-Correspondence

XII–94. *Moscow* Engineering Institute of Water Supply and Irrigation (of V.P. Viliams)
Advanced Degrees: C; D
1203; 1509; 1511

XII–95. *Moscow* Engineering Institute of Land Conservation
Advanced Degrees: C; D
1301; 1508
Extension-Correspondence

XII–96. *Novocherkassk* Engineering-Hydromelioration Institute
Advanced Degrees: C
1511; 1512
Extension-Correspondence

XII–97. *Tashkent* Institute of Irrigation and Mechanization of Agriculture
Advanced Degrees: C
1508; 1509; 1511
Extension-Correspondence

E. *Forestry and Timber Industry Engineering*

XII–98. *Arkhangel'sk* Forestry Engineering Institute (of V.V. Kuibyshev)
Advanced Degrees: none
IIq: 0901
XIIb: 1512
XIIc: 0519; 0308
XIId: 0902
XIIa: 0308; 0810; 0903; 1202
XIg: 1202
Evening
Extension-Correspondence
Regular: E (1956)–2861
Ext.Cor.: E (1956)–297

XII–99. Belorussian Forestry Engineering Institute (of S.M. Kirov) in *Minsk*
Advanced Degrees: C
IIq: 0901
XIIb: 1512
XIId: 0902
Extension-Correspondence
Evening

XII–100. *Briansk* Forestry Engineering Institute
Advanced Degrees: none
XIIb: 1512
Extension-Correspondence

XII–101. *Voronezh* Forestry Engineering Institute
Advanced Degrees: C
IIq: 0901
XIIb: 1512
Extension-Correspondence

XII–102. *Leningrad* Forestry Engineering Academy (of S.M. Kirov)
Advanced Degrees: C; D
IIq: 0901
XIIb: 1512
XIIc: 0519; 0606
XIId: 0902
IIf: 0903; 0904
IIo: 1719; 1720
Evening
Total: E (1956)–4627

XII–103. *L'vov* Forestry Engineering Institute
Advanced Degrees: none
IIq: 0901
XIIb: 1512
XIId: 0902
Evening
Extension-Correspondence
Total: E (1957)–2796

XII–104. *Moscow* Forestry Engineering Institute
Advanced Degrees: C; D
IIq: 0901
XIIb: 1512
XIIc: 0519
XIId: 0902; 0904
IIIdx: 0606; 0608
IIo: 1719; 1720
Evening
Extension-Correspondence

XII–104a. Evening branch of Moscow Forestry Engineering Institute at *Likinsk* autobus plant: 0519

XII–105. Volga (Povolzhskii) Forestry Engineering Institute (of M. Gor'kii) in *Ioshkar-Ola*
Advanced Degrees: none
IIq: 0519; 0901; 0902
XIIb: 1512
Extension-Correspondence

XII–106. Siberian Forestry Engineering Institute in *Krasnoiarsk*
Advanced Degrees: C
IIq: 0901
XIIb: 1512
XIIc: 0519
XIId: 0516; 0803; 0902
IIf: 0903; 0904; 1104
Evening
Extension-Correspondence
Total: E (1956)–3500; G (1956)–352

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XII–107. Ural Forestry Engineering Institute in *Sverdlovsk*
Advanced Degrees: C
IIq: 0901
XIIb: 1512
XIIc: 0519
XIId: 0902
IIf: 0810; 0811; 0903
Extension-Correspondence
Total: G (1956)–373

XIII. ECONOMICS (MANAGEMENT) INSTITUTES

A. *Economics Institutes*

XIII–2. Belorussian State Institute of National Economy (of V.V. Kuibyshev) in *Minsk*
Advanced Degrees: none
XIIIs: 1702
XIIa: 1734; 1737
XIIIu: 1729; 1732; 1733
Evening
Extension-Correspondence

XIII–3. *Kuibyshev* Planning Institute
Advanced Degrees: none
XIIIm: 1702; 1703
XIIIb: 1716
Evening
Extension-Correspondence

XIII–4. *Moscow* State Economics Institute
Advanced Degrees: C; D
XIIIk: 1701; 1704
XIIIm: 1702
XIIIh: 1734
XIIIb: 1716
XIIIo: 1703
Evening
Regular: E (1956)–3350

XIII–5. *Moscow* Economics-Statistics Institute
Advanced Degrees: C
XIIIg: 1736
XIIIp: 1738
Evening
Extension-Correspondence

XIII–6. *Seratov* Economics Institute
Advanced Degrees: none
XIIIm: 1702
XIIIb: 1716
XIIIf: 1734
XIIIa: 1737
Evening
Extension-Correspondence

B. *Finance-Economics Institutes*

XIII–7. *Irkutsk* Finance-Economics Institute
Advanced Degrees: none
XIIIj: 1734; 1737
XIIIs: 1702; 1716; 1729
IIo: 1705; 1721
Evening
Extension-Correspondence
Total: E (1955)–1342; G (1955)–187

XIII–8. *Kazan'* Finance-Economics Institute (of V.V. Kuibyshev)
Advanced Degrees: none
XIIIj: 1734
XIIIa: 1737
Evening
Extension-Correspondence

XIII–9. *Kiev* Finance-Economics Institute
Advanced Degrees: C
XIIIj: 1734; 1736; 1737; 1738
XIIIm: 1702
XIIIb: 1716
Evening
Extension-Correspondence

XIII–10. *Leningrad* Finance-Economics Institute
Advanced Degrees: C; D
XIIIj: 1734
XIIIs: 1702
XIIIa: 1736; 1737
Evening
Extension-Correspondence

XIII–11. *Moscow* Finance Institute
Advanced Degrees: C; D
XIIIj: 1734
XIIIf: 1734
XIIIa: 1737
Evening

XIII–12. *Odessa* Credit-Economics Institute
Advanced Degrees: none
XIIIf: 1734
XIIIa: 1737
Evening
Extension-Correspondence

XIII–13. *Rostov-on-Don* Finance-Economics Institute
Advanced Degrees: C
XIIIj: 1716; 1734
XIIIa: 1737
XIIIs: 1702; 1716
Evening
Extension-Correspondence

XIII–14. *Tashkent* Finance-Economics Institute
Advanced Degrees: none
XIIIj: 1734
XIIIs: 1702; 1716
XIIIa: 1736; 1737
Evening
Extension-Correspondence

C. *Trade-Economics Institutes*

XIII–15. *Leningrad* Institute of Soviet Trade (of F. Engels)
Advanced Degrees: C
XIIIu: 1729
XIIIa: 1737
XIIIq: 1732; 1733
IIyy: 1011
Evening

XIII–16. *L'vov* Trade-Economics Institute
Advanced Degrees: none
XIIIu: 1729
XIIIj: 1734
XIIIa: 1737
XIIIq: 1738
Evening
Regular: E (1957)–2245
Evening: E (1957)–239

XIII–17. *Moscow* Institute of National Economy (of G.V. Plekhanov)
Advanced Degrees: none
XIIIu: 1729
XIIIa: 1737
XIIIq: 1732; 1733
IIyy: 1011
Evening
Regular: E (1956)–5094

XIII–18. *Novosibirsk* Institute of Soviet Cooperative Trade
Advanced Degrees: none
No divisions given: 1729; 1732; 1733

XIII–19. *Samarkand* Institute of Soviet Trade (of V.V. Kuibyshev)
Advanced Degrees: none
XIIIu: 1729; 1737
XIIIq: 1732; 1733
IIyy: 1011
Evening
Total: E (1956)–1353

XIII–20. *Khar'kov* Institute of Soviet Trade
Advanced Degrees: none
XIIIu: 1729
XIIIa: 1737
XIIIq: 1732; 1733
IIyy: 1011
Evening

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D. *Engineering-Economics Institutes*

XIII–21. *Leningrad* Engineering-Economics Institute
Advanced Degrees: C; D
IIx: 1704; 1709; 1722
XIIId: 1711
IIrr: 1707
Evening

XIII–22. *Moscow* Engineering-Economics Institute (of Sergo Ordzhonikidze)
Advanced Degrees: C; D
IIx: 1709
XIIIe: 1711
IIrr: 1707
VIIIc: 1725
IXj: 1721; 1722
Evening
Extension-Correspondence

XIII–23. *Khar'kov* Engineering-Economics Institute
Advanced Degrees: C
IIx: 1709
XIIId: 1711
IIbb: 1708
XIIIn: 1703
IIee: 1705
Evening
Extension-Correspondence

XIV. INSTITUTES OF JURISPRUDENCE *

XIV–1. *Sverdlovsk* Jurisprudence Institute (of A.Ia. Vyshinskii)
Advanced Degrees: none
1801
Extension-Correspondence
Evening

XIV–2. *Saratov* Jurisprudence Institute (of D.I. Kurskii)
Advanced Degrees: none
1801
Extension-Correspondence
Evening

XIV–3. *Khar'kov* Jurisprudence Institute
Advanced Degrees: none
1801
Extension-Correspondence
Evening

XV. HIGHER EDUCATIONAL INSTITUTIONS OF ARTS

A. *Institutes of Painting, Sculpture and Architecture*

XV–1. *Moscow* Institute of Architecture
Advanced Degrees: C; D
1201
Evening

XV–2. *Moscow* Higher School of Arts and Crafts (formerly Stroganov School)
Advanced Degrees: C
12XX; 2219; 2221; 2222; 2223; 2224; 2226

XV–3. *Leningrad* Higher School of Arts and Crafts (of V.I. Mukhina)
Advanced Degrees: none
12XX; 2219; 2221; 2222; 2223; 2224; 2226; 2227

B. *Arts Institutes*

XV–4. State Arts Institute of the Lithuanian SSR in *Vilnius*
Advanced Degrees: none
1201; 2219; 2220; 2221; 2226; 2227
Total: E (1956)–183; G (1956)–35

XV–5. State Arts Institute of the Estonian SSR in *Tallinn*
Advanced Degrees: none
1201; 2219; 2220; 2221; 2222; 2223; 2224; 2226; 2227; 22XX
Total: E (1956)–164

XV–6. State Academy of Arts of the Latvian SSR in *Riga*
Advanced Degrees: none
2219; 2220; 2221; 2226
Total: E (1955)–100

XV–7. Institute of Painting, Sculpture and Architecture (of I.E. Repin) in *Leningrad*
Advanced Degrees: C; D
1201; 2219; 2220; 2221; 2228
Extension-Correspondence

XV–8. *Kiev* State Arts Institute
Advanced Degrees: none
1201; 2219; 2220; 2221

XV–9—*L'vov* State Institute of Applied and Decorative Arts
Advanced Degrees: none
2219; 2221; 2223; 2226; 2227
Total: E (1957)–134

XV–10. *Moscow* State Arts Institute (of V.I. Surikov)
Advanced Degrees: C
2219; 2220; 2221

XV–11. *Tbilisi* Academy of Arts
Advanced Degrees: none
1201; 2219; 2220; 2221; 2226

XV–12. *Khar'kov* State Arts Institute
Advanced Degrees: none
2219; 2220; 2221

C. *Conservatories*

XV–13. *Alma-Ata* State Conservatory (of Kurmangaza)
Advanced Degrees: none
2201; 2202; 2203; 2204; 2206; 2207; 2208; 2209
Extension-Correspondence
Evening
Regular: E (1956)–320

XV–14. Azerbaidzhan State Conservatory (of Uzeir Gadzhibekov) in *Baku*
Advanced Degrees: none
2201; 2202; 2203; 2204; 2206; 2207; 2208
Evening

XV–15. Belorussian State Conservatory in *Minsk*
Advanced Degrees: none
2201; 2202; 2203; 2204; 2206; 2207; 2208
Extension-Correspondence
Evening

XV–16. State Conservatory of the Lithuanian SSR in *Vilnius*
Advanced Degrees: none
2201; 2202; 2203; 2204; 2206; 2207; 2208; 2209
Extension-Correspondence
Evening
Total: E (1956)–277; G (1956)–50

XV–17. *Gor'kii* State Conservatory (of M.I. Glinka)
Advanced Degrees: none
2201; 2202; 2204; 2206; 2207; 2208
Evening

XV–18. State Conservatory of the Latvian SSR in *Riga*
Advanced Degrees: none
2201; 2202; 2203; 2204; 2206; 2207; 2208; 2209
Extension-Correspondence
Evening
Total: E (1955)–200

XV–19. State Music and Pedagogical Institute (of Gnesins) in *Moscow*
Advanced Degrees: none
2201; 2202; 2203; 2204; 2206; 2207
Evening
Extension-Correspondence

XV–20. *Erevan* State Conservatory (of Komitas)
Advanced Degrees: none
2201; 2202; 2204; 2206; 2207; 2208
Extension-Correspondence
Evening

XV–21. *Kazan'* State Conservatory
Advanced Degrees: none
2201; 2202; 2204; 2206; 2207; 2208
Evening

XV–22. *Kiev* State Conservatory (of P.I. Chaikovskii)
Advanced Degrees: C
2201; 2202; 2203; 2204; 2205; 2206; 2207; 2208; 22XZ
Evening
Extension-Correspondence

* In all the remaining institutions—jurisprudence, art, medical, and pedagogical—the individual specialties are not grouped under divisions.

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XV–23. *Kishinev* State Conservatory
Advanced Degrees: none
2201; 2202; 2203; 2204; 2206; 2207; 2208; 2209
Extension-Correspondence

XV–24. *Leningrad* State Conservatory (of N.A. Rimski-Korsakov)
Advanced Degrees: C; D
2201; 2202; 2204; 2205; 2206; 2207; 2208; 2210
Evening
Extension-Correspondence
Total: E (1956)–615

XV–25. *L'vov* State Conservatory (of N.V. Lysenko)
Advanced Degrees: none
2201; 2202; 2203; 2204; 2206; 2208; 22XZ
Extension-Correspondence
Total: E (1957) 273

XV–26. *Moscow* State Conservatory (of P.I. Chaikovski)
Advanced Degrees: C; D
2201; 2202; 2204; 2205; 2206; 2208
Evening

XV–27. *Novosibirsk* State Conservatory (of M.I. Glinka)
Advanced Degrees: none
2201; 2202; 2203; 2204; 2206; 2207; 2208

XV–28. *Odessa* State Conservatory (of A.V. Nezhdanova)
Advanced Degrees: none
2201; 2202; 2203; 2204; 2206; 2208; 22XZ
Evening
Extension-Correspondence

XV–29. *Saratov* State Conservatory (of L.V. Sobinov)
Advanced Degrees: none
2201; 2202; 2203; 2204; 2206; 2208
Evening
Extension-Correspondence

XV–30. *Tallinn* State Conservatory
Advanced Degrees: none
2201; 2202; 2204; 2206; 2207; 2208; 2209
Evening
Extension-Correspondence
Total: E (1956)–149

XV–31. *Tashkent* State Conservatory
Advanced Degrees: none
2201; 2202; 2203; 2204; 2206; 2207; 2208
Extension-Correspondence
Evening

XV–32. *Tbilisi* State Conservatory (of V. Saradzhishvili)
Advanced Degrees: none
2201; 2202; 2204; 2206; 2207; 2208
Evening
Extension-Correspondence

XV–33. Ural State Conservatory (of M.P. Musorgski) in *Sverdlovsk*
Advanced Degrees: none
2201; 2202; 2203; 2204; 2205; 2206; 2207; 2208; 2210
Evening
Extension-Correspondence

XV–34. *Khar'kov* State Conservatory
Advanced Degrees: none
2201; 2202; 2203; 2204; 2206; 2207; 2208; 22XZ
Evening
Extension-Correspondence

D. *Theatrical and Theatrical Arts Institutes and Institute of Cinematography*

XV–35. Azerbaidzhan State Theatrical Institute (of M.A. Aliev) in *Baku*
Advanced Degrees: none
2209

XV–36. Belorussian State Theatrical Arts Institute in *Minsk*
Advanced Degrees: none
2209; 2211; 2219; 2220; 2221

XV–37. State Institute of Theatrical Arts (of A.V. Lunacharskii) in *Moscow*
Advanced Degrees: C; D
2209; 2210; 2211; 2213; 2217; 22XY
Extension-Correspondence
Evening

XV–38. Georgian State Theatrical Institute (of Shota Rustaveli) in *Tbilisi*
Advanced Degrees: none
2209; 2211

XV–39. *Erevan* State Theatrical Arts Institute
Advanced Degrees: none
2209; 2211; 2217; 2219; 2220; 2221

XV–40. *Kiev* State Theatrical Institute (of I.K. Karpenko-Karoi)
Advanced Degrees: none
2209; 2211; 2217
Extension-Correspondence

XV–41. *Leningrad* State Theatrical Institute (of A.N. Ostrovski)
Advanced Degrees: none
2209; 2211; 2216; 2217; 22XY
Evening
Total: E (1956)–311

XV–42. *Tashkent* State Theatrical Arts Institute (of A.N. Ostrovski)
Advanced Degrees: none
2209; 2211; 2217; 2219; 2220; 2221; 22XY
Evening

XV–43. Theatrical School (of B.V. Shchepkin) at the State Small (Malyi) Theatre in *Moscow*
Advanced Degrees: none
2209; 22XY
Evening

XV–44. Theatrical School (of B.V. Shchukin) at the State Theater of E. Vakhtangov in *Moscow*
Advanced Degrees: none
2209; 22XY

XV–45. *Khar'kov* State Theatrical Institute
Advanced Degrees: none
2209; 2211

XV–46. School-Studio of V.I. Nemirovich-Danchenko at the MKhAT in *Moscow*
Advanced Degrees: none
2209; 2216; 22XY

XV–47. All-Union State Institute of Cinematography in *Moscow*
Advanced Degrees: C
2028; 2209; 2214; 2215; 2218; 2219; 2220
Extension-Correspondence

XVI. HIGHER MEDICAL INSTITUTES

A. *Medical Institutes*

XVI–1. Azerbaidzhan State Medical Institute in *Baku*
Advanced Degrees: C; D
1901; 1902; 1903; 1904; 1905
Extension-Correspondence

XVI–2. *Aktiubinsk* State Medical Institute
Advanced Degrees: none
1901

XVI–3. Altai Medical Institute in *Barnaul*
Advanced Degrees: none
1901

XVI–4. *Arkhangel'sk* Medical Institute
Advanced Degrees: none
1901; 1904
Total: E (1956)–1301

XVI–5. *Andizhan* Medical Institute
Advanced Degrees: none
1901

XVI–6. *Astrakhan'* Medical Institute
Advanced Degrees: none
1901
Total: E (1957)–1250; G (1957)–174

XVI–7. Bashkir State Medical Institute (of the 15th anniversary of VLKSM) in *Ufa*
Advanced Degrees: C
1901

XVI–8. *Blagoveshchensk* Medical Institute
Advanced Degrees: none
1901

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XVI–9. *Vinnitsa* Medical Institute
Advanced Degrees: none
1901
Evening

XVI–10. *Vitebsk* Medical Institute
Advanced Degrees: none
1901

XVI–10A. *Vladivostok* Medical Institute
Advanced Degrees: None
1901

XVI–11. *Voronezh* State Medical Institute
Advanced Degrees: C; D
1901; 1902; 1904
Evening

XVI–12. *Gor'kii* Medical Institute (of S.M. Kirov)
Advanced Degrees: C; D
1901; 1902
Evening

XVI–13. Dagestan Medical Institute in *Makhach-Kala*
Advanced Degrees: none
1901

XVI–14. *Dnepropetrovsk* State Medical Institute
Advanced Degrees: C
1901; 1902; 1903; 1905

XVI–15. *Erevan* Medical Institute
Advanced Degree: C; D
1901; 1903; 1904

XVI–16. *Ivanovo* State Medical Institute
Advanced Degrees: C
1901; 1902
Evening
Total: E (1955)–2231; G (1955)–209

XVI–17. *Izhevsk* Medical Institute
Advanced Degrees: none
1901
Total: E (1956)–1244; G (1956)–180

XVI–18. *Irkutsk* State Medical Institute
Advanced Degrees: C
1901; 1903; 1904; 1905
Evening
Total: E (1955)–2351; G (1955)–295

XVI–19. *Kazan'* State Medical Institute
Advanced Degrees: C; D
1901; 1902; 1904

XVI–20. Kazakh Medical Institute in *Alma-Ata*
Advanced Degrees: C; D
1901; 1902; 1903; 1905
Regular: E (1956) 3572

XVI–21. *Kalinin* Medical Institute
Advanced Degrees: none
1901; 1904
Total: E (1956)–1068

XVI–22. *Karaganda* Medical Institute
Advanced Degrees: C
1901
Regular: E (1956)–2132

XVI–23. *Kaunas* Medical Institute
Advanced Degrees: none
1901; 1904; 1905
Total: E (1956)–1545; G (1956)–104

XVI–24. *Kemerovo* Medical Institute
Advanced Degrees: none
1901; 1904
Evening

XVI–25. *Kiev* Medical Institute (of A.A. Bogomolets)
Advanced Degrees: C; D
1901; 1902; 1903; 1904
Evening
Extension-Correspondence

XVI–26. Kirgiz State Medical Institute in *Frunze*
Advanced Degrees: C
1901; 1902; 1903

XVI–27. *Kishinev* State Medical Institute
Advanced Degrees: C
1901; 1902

XVI–28. *Krasnoiarsk* Medical Institute
Advanced Degrees: none
1901
Evening
Total: E (1956)–1578; G (1956)–171

XVI–29. Crimean State Medical Institute (of I.V. Stalin) in *Simferopol'*
Advanced Degrees: C
1901; 1902
Evening

XVI–30. Kuban' Medical Institute (of the Red Army) in *Krasnodar*
Advanced Degrees: C
1901

XVI–31. *Kuibyshev* State Medical Institute
Advanced Degrees: C; D
1901

XVI–32. *Kursk* Medical Institute
Advanced Degrees: none
1901

XVI–33. First *Leningrad* Medical Institute (of academician I.P. Pavlov)
Advanced Degrees: C; D
1901
Total: E (1956)–3725

XVI–34. *Leningrad* Sanitary-Hygiene Medical Institute
Advanced Degrees: C; D
1903; 1904

XVI–35. *Leningrad* Medical Pediatric Institute
Advanced Degrees: C; D
1902
Evening
Total: E (1956)–2579

XVI–36. *Lugansk* State Medical Institute
Advanced Degrees: none
1901
Evening

XVI–37. *L'vov* Medical Institute
Advanced Degrees: C; D
1901; 1902; 1904; 1905
Total: E (1957)–4018

XVI–38. *Minsk* State Medical Institute
Advanced Degrees: C; D
1901

XVI–39. First *Moscow* Medical Institute (of I.M. Sechenov)
Advanced Degrees: C; D
1901; 1903; 1905
Extension-Correspondence
Evening
Regular: E (1956)–3999

XVI–40. Second *Moscow* Medical Institute (of N.I. Pirogov)
Advanced Degrees: C; D
1901; 1902
Evening
Regular: E (1956)– 3788

XVI–41. *Novosibirsk* Medical Institute
Advanced Degrees: C
1901
Evening

XVI–42. *Odessa* State Medical Institute
Advanced Degrees: C
1901; 1902; 1904
Evening

XVI–43. *Omsk* State Medical Institute (of M.I. Kalinin)
Advanced Degrees: C
1901; 1902; 1903; 1904
Total: E (1956) 2894

XVI–44. *Orenburg* Medical Institute
Advanced Degrees: none
1901

XVI–45. *Perm'* State Medical Institute
Advanced Degrees: C
1901; 1904
Evening

XVI–46. *Riga* Medical Institute
Advanced Degrees: C; D

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1901; 1902; 1904; 1905
Total: E (1955)–1800

XVI–47. *Rostov-on-Don* State Medical Institute
Advanced Degrees: C
1901; 1902; 1903

XVI–48. *Riazan'* Medical Institute (of academician I.P. Pavlov)
Advanced Degrees: C; D
1901
Evening
Total: E (1956)–2255; G (1956)–218

XVI–49. *Samarkand* State Medical Institute (of academician I.P. Pavlov)
Advanced Degrees: C
1901
Total: E (1956)– 1353

XVI–50. *Saratov* State Medical Institute
Advanced Degrees: C; D
1901; 1902
Evening

XVI–51. *Sverdlovsk* State Medical Institute
Advanced Degrees: C; D
1901; 1902; 1903
Evening

XVI–52. North-Osetin Medical Institute in *Ordzhonikidze*
Advanced Degrees: none
1901

XVI–53. *Semipalatinsk* Medical Institute
Advanced Degrees: none
1901
Regular (E)–1956–1250

XVI–54. *Smolensk* State Medical Institute
Advanced Degrees: C
1901
Total: E (1957)–2263; G (1957)–277

XVI–55. *Stavropol'* Medical Institute
Advanced Degrees: none
1901; 1904

XVI–56. *Stalinabad* State Medical Institute (of the name of Abu-Ali Ibn-Sina)
Advanced Degrees: none
1901

XVI–57. *Stalingrad* State Medical Institute
Advanced Degrees: C
1901
Total: E (1955)–1701; G (1956)– 180

XVI–58. *Stalino* State Medical Institute (of M. Gor'kii)
Advanced Degrees: C
1901; 1902; 1903
Evening

XVI–59. *Stanislav* Medical Institute
Advanced Degrees: none
1901
Evening

XVI–60. *Tashkent* Medical Institute
Advanced Degrees: C; D
1901; 1902; 1903; 1904

XVI–61. *Tbilisi* State Medical Institute
Advanced Degrees: C; D
1901; 1902; 1903; 1904; 1905
Extension-Correspondence

XVI–62. *Ternopol'* State Medical Institute
Advanced Degrees: none
1901

XVI–63. *Tomsk* State Medical Institute
Advanced Degrees: C; D
1901; 1902; 1905
Total: E (1956)–2734; G (1956)–315

XVI–64. Turkmenian State Medical Institute in *Ashkhabad*
Advanced Degrees: C
1901

XVI–65. *Khabarovsk* State Medical Institute
Advanced Degrees: C
1901; 1902

XVI–66. *Khar'kov* Medical Institute
Advanced Degrees: C; D
1901; 1902; 1903
Evening

XVI–67. *Cheliabinsk* Medical Institute
Advanced Degrees: none
1901
Total: E (1955)–1612; G (1956)–166

XVI–68. *Chernovtsy* Medical Institute
Advanced Degrees: C
1901

XVI–69. *Chita* Medical Institute
Advanced Degrees: none
1901; 1904

XVI–70. *Iaroslavl'* Medical Institute
Advanced Degrees: none
1901
Total: E (1956)–1796

B. *Medical Stomatological Institutes*

XVI–71. *Moscow* Medical Stomatological Institute
Advanced Degrees: C; D
1904

XVI–72. *Khar'kov* Medical Stomatological Institute
Advanced Degrees: none
1904

C. *Pharmaceutical Institutes*

XVI–73. *Leningrad* Chemical-Pharmaceutical Institute
Advanced Degrees: C
1905
Extension-Correspondence

XVI–75. *Odessa* Pharmaceutical Institute
Advanced Degrees: none
1905
Extension-Correspondence

XVI–76. *Perm'* Pharmaceutical Institute
Advanced Degrees: none
1905
Extension-Correspondence

XVI–77. *Piatigorsk* Pharmaceutical Institute
Advanced Degrees: none
1905
Evening

XVI–78. *Tashkent* Pharmaceutical Institute
Advanced Degrees: none
1905
Extension-Correspondence

XVI–79. *Khar'kov* Pharmaceutical Institute
Advanced Degrees: none
1905

XVII. HIGHER EDUCATIONAL INSTITUTES OF PHYSICAL CULTURE

XVII–1. Azerbaidzhan State Institute of Physical Culture (of S.M. Kirov) in *Baku*
Advanced Degrees: none
1906
Extension-Correspondence

XVII–2. Armenian State Institute of Physical Culture in *Erevan*
Advanced Degrees: none
1906
Extension-Correspondence

XVII–3. Belorussian State Institute of Physical Culture in *Minsk*
Advanced Degrees: none
1906
Extension-Correspondence

XVII–4. State Institute of Physical Culture (of I.V. Stalin) in *Moscow*
Advanced Degrees: C
1906
Extension-Correspondence

XVII–5. State Institute of Physical Culture (of P.F. Lesgaft) in *Leningrad*
Advanced Degrees: C

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1906
Extension-Correspondence
Total: E (1956)–982

XVII–6. Georgian State Institute of Physical Culture in *Tbilisi*
Advanced Degrees: none
1906
Extension-Correspondence

XVII–7. Kazakh State Institute of Physical Culture in *Alma-Ata*
Advanced Degrees: none
1906
Extension-Correspondence
Regular: E (1956)–418

XVII–8. *Kiev* State Institute of Physical Culture
Advanced Degrees: none
1906
Extension-Correspondence

XVII–9. Kirgiz State Institute of Physical Culture in *Frunze*
Advanced Degrees: none
1906
Extension-Correspondence

XVII–10. Latvian State Institute of Physical Culture in *Riga*
Advanced Degrees: none
1906
Extension-Correspondence
Total: E (1955)–400

XVII–11. Lithuanian State Institute of Physical Culture in *Kaunas*
Advanced Degrees: none
1906
Extension-Correspondence
Total: E (1956)–374; G (1956)–84

XVII–12. *L'vov* State Institute of Physical Culture
Advanced Degrees: none
1906
Extension-Correspondence
Total: E (1957)–480

XVII–13. *Omsk* State Institute of Physical Culture
Advanced Degrees: none
1906
Extension-Correspondence
Total: E (1956)–966

XVII–14. *Smolensk* State Institute of Physical Culture
Advanced Degrees: none
1906
Extension-Correspondence
Total: E (1957)–394; G (1957)–94

XVII–15. Uzbek State Institute of Physical Culture in *Tashkent*
Advanced Degrees: none
1906
Extension-Correspondence

XVIII. PEDAGOGICAL, LIBRARY, HISTORICAL-ARCHIVE AND LITERATURE HIGHER EDUCATIONAL INSTITUTES

A. *Pedagogical Institutes*•

XVIII–1. *Abakan* Pedagogical Institute
21PQ; 21XX; 21YY
Extension-Correspondence
Total: E (1956)–670; G (1956)–128

XVIII–2. Adygei Pedagogical Institute in *Maikop*
21PQ; 21 XY; 21YY
Extension-Correspondence

XVIII–3. Azerbaidzhan Pedagogical Institute (of V.I. Lenin) in *Baku*
2122; 21QQ; 21PP (Azerbaidzhan); 21YY; 21YZ; 21ZY; 21ZX
Extension-Correspondence

XVIII–4. Azerbaidzhan Pedagogical Institute of Russian Language and Literature (of Mirza Fatali Akhundov) in *Baku*
Advanced Degrees: C
2101; 21PR

XVIII–6. *Andizhan* Pedagogical Institute (of the 30th anniversary of the Komsomol)
2101; 21PP; 21QQ; 21YY; 21ZX
Extension-Correspondence

XVIII–7. *Arzamas* Pedagogical Institute
21XY; 21YY
Extension-Correspondence

XVIII–8. *Armavir* Pedagogical Institute
21QQ; 21XX; 21YY
Extension-Correspondence

XVIII–9. *Arkhangel'sk* Pedagogical Institute (of M.V. Lomonosov)
2103 (English); 2103 (German); 21XX; 21YY; 21ZY; 21ZZ
Extension-Correspondence
Total: E (1955)–1876

XVIII–10. *Astrakhan'* Pedagogical Institute (of S.M. Kirov)
21XY; 21YY
Extension-Correspondence
Total: E (1957)–668; G (1957)–120

XVIII–11. *Balashov* Pedagogical Institute
21XY; 21YY
Extension-Correspondence

XVIII–12. *Barnaul* Pedagogical Institute
2103; 21XX; 21YX; 21YZ
Extension-Correspondence

XVIII–13. *Batumi* Pedagogical Institute (of Shota Rustaveli)
21PP; 21QQ; 21XY; 21YY; 21ZY; 21ZX

XVIII–14. *Belgorod* Pedagogical Institute
21XY; 21YY
Evening
Extension-Correspondence

XVIII–15. *Bel'tsy* Pedagogical Institute
2103; 21PQ; 21PR; 21PS; 21XY; 21YY; 21YZ
Extension-Correspondence

XVIII–16. *Berdichev* Pedagogical Institute
21QQ
Extension-Correspondence

XVIII–16A. *Berdiansk* Pedagogical Institute (of P.D. Osipenko)
21QQ; 21YX; 21YZ
Extension-Correspondence

XVIII–17. *Birsk* Pedagogical Institute
21XY; 21YY
Extension-Correspondence

XVIII–18. *Biisk* Pedagogical Institute
21XX; 21YY
Extension-Correspondence

XVIII–19. *Blagoveshchensk* Pedagogical Institute (of M.I. Kalinin)
2103; 21XX; 21YY; 21ZY; 21ZZ
Extension-Correspondence

XVIII–20. *Borisoglebsk* Pedagogical Institute
21XX; 21YY

XVIII–21. *Brest* Pedagogical Institute (of A.S. Pushkin)
2101; 2102; 21YY; 21YZ; 21ZY
Extension-Correspondence

XVIII–22. Buriat Pedagogical Institute (of D. Banzarov) in *Ulan-Ude*
21PQ; 21PT; 21XX; 21YX; 21YZ
Extension-Correspondence
Total: E (1956)–2711; G (1956)–242

XVIII–23. *Bukhara* Pedagogical Institute (of Sergo Ordzhonikidze)
2101; 21PP; 21QQ; 21YX; 21YZ; 21ZX
Extension-Correspondence

XVIII–24. *Velikie Luki* Pedagogical Institute
21XX; 21YY
Extension-Correspondence
Total: E (1956)–2080; G (1956)–253

XVIII–25. *Vilnius* Pedagogical Institute
2101; 2102; 2103; 2104; 21PU; 21PV; 21YX; 21YZ; 21ZX; 21ZY; 21ZZ

•There are only a few pedagogical institutes which offer advanced degree training. The wording "advanced degrees" is omitted from the listing below for this reason. In the few cases where advanced degrees are offered, it is so indicated.

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Extension-Correspondence
Total: E (1956)–2238; G (1956)–431

XVIII–26. *Vinnitsa* Pedagogical Institute (of N. Ostrovski)
2101a; 21PR; 21QQ; 21XY; 21YY; 21YZ; 21ZZ
Extension-Correspondence

XVIII–27. *Vitebsk* Pedagogical Institute (of S.M. Kirov)
21QQ; 21YY; 21YZ; 21ZX
Extension-Correspondence

XVIII–28. *Vladimir* Pedagogical Institute (of P.I. Lebedev-Polianski)
21XY; 21YY
Extension-Correspondence
Total: E (1957)–1379; G (1957)–208

XVIII–29. *Vologda* Pedagogical Institute
2103; 21PT; 21XX; 21YX; 21YZ; 21ZY
Extension-Correspondence

XVIII–30. *Voronezh* Pedagogical Institute
2103; 21PW; 21QQ; 21XX; 21YX; 21YZ; 21ZY; 21ZZ
Extension-Correspondence

XVIII–31. *Glazov* Pedagogical Institute (of V.G. Korolenko)
21PQ; 21QQ; 21XY; 21YY
Extension-Correspondence
Total: E (1956)–1088; G (1956)–182

XVIII–32. *Glukhov* Pedagogical Institute
21QQ
Extension-Correspondence

XVIII–33. *Gomel'* Pedagogical Institute (of V.P. Chkalov)
21PQ; 21QQ; 21YY; 21YZ; 21ZX; 21ZZ
Extension-Correspondence

XVIII–34. *Gori* Pedagogical Institute (of N. Baratashvili)
21PP; 21QQ; 21XX; 21YY; 21YZ; 21ZY; 21ZX

XVIII–35. *Gor'kii* Pedagogical Institute (of A.M. Gor'kii)
2110; 21QQ; 21XX; 21YX; 21YZ; 21ZY; 21ZZ
Extension-Correspondence

XVIII–36. *Gorno-Altaisk* Pedagogical Institute
21XX; 21YY; 21ZY
Extension-Correspondence

XVIII–37. *Grodno* Pedagogical Institute
21PP; 21QQ; 21XX; 21YY; 21YZ
Extension-Correspondence

XVIII–38. *Gur'ev* Pedagogical Institute
21PQ; 21YY
Extension-Correspondence
Regular E (1956)–502

XVIII–39. Dagestan Women's Pedagogical Institute (of Gamzat Tsadas) in *Makhach-Kala*
21PQ; 21YY

XVIII–40. *Daugavpils* Pedagogical Institute
2101a; 21XY; 21YY; 21ZX; 21ZZ
Extension-Correspondence
Total: E (1955)–1000

XVIII–41. *Drogobych* Pedagogical Institute (of I.Ia. Franko)
2101a; 2102a; 21YX; 21YZ; 21ZZ
Extension-Correspondence

XVIII–42. *Elabuga* Pedagogical Institute
2101; 21YY; 21XY
Extension-Correspondence

XVIII–43. *Elets* Pedagogical Institute
21XY; 21YZ
Extension-Correspondence

XVIII–44. *Eniseisk* Pedagogical Institute
21XX; 21YY
Total: E (1956)–523; G (1956)–none

XVIII–45. *Erevan* Armenian Pedagogical Institute (of Kh. Abovian)
2110; 21PP; 21YX; 21YZ; 21ZY; 21ZX

XVIII–46. *Zhitomir* Pedagogical Institute (of I.Ia. Franko)
21PR; 21XY; 21YY; 21YZ
Extension-Correspondence

XVIII–47. *Zaporozh'e* Pedagogical Institute
21PR; 21XY; 21YX; 21YZ
Extension-Correspondence

XVIII–48. *Ivanovo* Pedagogical Institute
2103; 21XX; 21YX; 21YZ; 21ZZ
Extension-Correspondence
Total: E (1955)–3614; G (1955)–673

XVIII–49. *Izmail* Pedagogical Institute
21QQ
Extension-Correspondence

XVIII–50. *Irkutsk* Pedagogical Institute
21QQ; 21XX; 21YX; 21YZ; 2110
Extension-Correspondence
Total: E (1955)–1548; G (1955)–185

XVIII–51. *Ishim* Pedagogical Institute
21XX; 21YY; 21QQ
Extension-Correspondence

XVIII–52. *Kazan'* Pedagogical Institute
Advanced Degrees: C
2103; 21XX; 21YZ; 21ZY; 21ZZ; 2101; 21PT
Extension-Correspondence

XVIII–53. Kazakh Women's Pedagogical Institute in *Alma-Ata*
2101a; 2113; 21PQ; 21YY; 21ZX; 21ZY
Regular: E (1956)–703

XVIII–53A. Kazakh Pedagogical Institute (of Abai) in *Alma-Ata*
21PP (Kazakh); 21PP (Uigur); 21PQ; 21PR; 21XX; 21XY; 21YX; 21YZ; 21ZX; 21ZY
Extension-Correspondence

XVIII–54. *Kaliningrad* Pedagogical Institute
21XX; 21YY
Extension-Correspondence

XVIII–55. *Kaluga* Pedagogical Institute
21QQ; 21XY; 21YY; 21ZX
Extension-Correspondence
Total: E (1956)–3172

XVIII–56. *Kamenets-Podol'sk* Pedagogical Institute
21PP; 21XX; 21YY; 21YZ; 21ZZ
Extension-Correspondence

XVII–57. *Kalinin* Pedagogical Institute (of M.I. Kalinin)
2103; 21QQ; 21XX; 21YX; 21YZ; 21ZY
Extension-Correspondence
Total: E (1956)–6861

XVIII–57A. Kamchatka Pedagogical Institute in *Petropavlovsk-on-Kamchatka*
21QQ; 21XX; 21YY
Extension-Correspondence

XVIII–58. *Karaganda* Pedagogical Institute
2101a; 21PQ 21XX; 21YY; 21YZ; 21ZX
Extension-Correspondence
Regular: E (1956)–1054

XVIII–59. Kara-Kalpak Pedagogical Institute in *Nukus*
2101; 2103 (German); 2103 (English); 21PP; 21YX; 21YZ; 21ZX; 21ZY; 21ZZ
Extension-Correspondence

XVIII–60. Karachaevsk-Cherkess Pedagogical Institute in *Karachaevsk*
21PQ (Russian and Karachai); 21PQ (Russian and Cherkess)
21YY
Extension-Correspondence

XVIII–61. Karelian Pedagogical Institute in *Petrozavodsk*
21XY; 21YX; 21YZ; 21ZZ
Extension-Correspondence

XVIII–62. *Karshi* Pedagogical Institute
2101; 21PP; 21YY; 21ZZ

XVIII–63. *Kemerovo* Pedagogical Institute
21XX; 21YX; 21YZ
Extension-Correspondence

XVIII–64. *Kzyl-Orda* Pedagogical Institute (of N.V. Gogol')
21PQ; 21YY; 21ZX
Extension-Correspondence
Regular: E (1956)–1482

XVIII–65. *Kiev* Pedagogical Institute (of M. Gor'kii)
Advanced Degrees: C
2101a; 2102b; 2110; 21YX; 21YZ
Extension-Correspondence

XVIII–66. Kirgiz Women's Pedagogical Institute (of V.V. Maiakovski) in *Frunze*
2101; 2103; 21PP; 21PQ; 21YY; 21YZ; 21ZX

XVIII–67. *Kirovobad* Pedagogical Institute (of G.B. Zardabi)
21YY; 21ZX

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XVIII–68. *Kirovograd* Pedagogical Institute (of A.S. Pushkin)
21PR; 21XY; 21YX; 21YZ; 21ZZ
Extension-Correspondence
Total: E (1956)–5530

XVIII–69. *Kirov* Pedagogical Institute (of V.I. Lenin)
2103; 21PW; 21XX; 21YZ; 21ZY; 21ZZ
Evening
Extension-Correspondence

XVIII–70. *Kishinev* Pedagogical Institute (of I. Kriange)
21PP; 21PQ; 21PR; 21QQ; 21YY; 21YZ; 21ZZ
Extension-Correspondence

XVIII–71. Komi Pedagogical Institute in *Syktyvkar*
21PQ; 21XX; 21XY; 21YY; 21ZX
Extension-Correspondence

XVIII–72. *Kokand* Women's Pedagogical Institute (of Mukimi)
2101; 21PP; 21QQ
Extension-Correspondence

XVIII–73. *Kolomna* Pedagogical Institute
21XX; 21YX; 21YZ

XVIII–74. *Komsomol'sk-on-Amur* Pedagogical Institute
21XX; 21YY
Extension-Correspondence

XVIII–75. *Kostroma* Pedagogical Institute (of N.A. Nekrasov)
21PT; 21XX; 21YY
Extension-Correspondence
Total: E (1955)–274

XVIII–76. *Krasnodar* Pedagogical Institute (of the 15th anniversary of VLKSM)
2103; 21PX; 21XX; 21YX; 21YZ; 21ZX; 21ZZ
Extension-Correspondence

XVIII–77. *Krasnoiarsk* Pedagogical Institute
Advanced Degrees: C
2103; 21PX; 21XX; 21YX; 21YZ; 21ZX; 21ZY; 21ZZ
Extension-Correspondence
Total: E (1956)–1677; G (1956)–342

XVIII–78. *Kremenets* Pedagogical Institute
21YX; 21YZ; 21ZX
Extension-Correspondence

XVIII–79. *Krivoi Rog* Pedagogical Institute
21YX; 21YZ; 21ZX
Extension-Correspondence

XVIII–80. Crimean Pedagogical Institute (of M.V. Frunze) in *Simferopol'*
2102a; 21XX; 21YX; 21YZ; 21ZX; 21ZY; 21ZZ
Extension-Correspondence

XVIII–81. *Kuibyshev* Pedagogical Institute (of V.V. Kuibyshev)
Advanced Degrees: C
2103; 21XX; 21YX; 21YZ; 21ZX
Extension-Correspondence

XVIII–82. *Kuliab* Pedagogical Institute
21PP; 21QQ; 21XX; 21YY

XVIII–83. *Kurgan* Pedagogical Institute
21PW; 21PX; 21XX; 21YX; 21YZ; 21ZZ
Extension-Correspondence
Total: E (1956)–2304

XVIII–84. *Kursk* Pedagogical Institute
2103; 21PW; 21XX; 21YX; 21YZ
Evening
Extension-Correspondence

XVIII–85. *Kustanai* Pedagogical Institute (of Amangel'da)
21XX; 21YY
Extension-Correspondence
Regular: E (1956)–416

XVIII–86. *Kutaisi* Pedagogical Institute (of A. Tsulukidze)
21PP; 21PR; 21QQ; 21XX; 21XY; 21YY; 21YZ; 21ZY; 21ZX
Extension-Correspondence

XVIII–87. *Kyzyl* Pedagogical Institute
21PQ; 21XX; 21YY
Extension-Correspondence

XVIII–88. *Leninabad* Pedagogical Institute (of S.M. Kirov)
2101; 2103; 21PP (Tadzhik); 21PP (Uzbek); 21QQ; 21YX; 21YY; 21YZ; 21ZX; 21ZY
Extension-Correspondence

XVIII–89. *Leninakan* Pedagogical Institute (of M. Nalbandian)
21PP; 21YX

XVIII–90. *Leningrad* Pedagogical Institute (of A.I. Gertsen)
Advanced Degrees: C, D
2103; 2110; 2111+2101; 2111+2104; (Special division for the training of teachers for the nationalities of the North); 21PY; 21QQ; 21XX; 21XY; 21YX; 21YZ; 21ZX; 21ZY; 21ZZ
Evening
Extension-Correspondence
Total: E (1956)–4881

XVIII–91. *Liepaia* Pedagogical Institute
21QQ
Extension-Correspondence
Total: E (1955)–400

XVIII–92. *Lipetsk* Pedagogical Institute
21XX; 21YY
Extension-Correspondence

XVIII–93. *Lugansk* Pedagogical Institute (of T.G. Shevchenko)
2102a; 21XX; 21YX; 21YZ; 21ZX; 21ZY; 21ZZ
Extension-Correspondence

XVIII–94. *Lutsk* Pedagogical Institute (of Lesia Ukrainka)
21PP; 21QQ; 21XX; 21YY
Extension-Correspondence

XVIII–95. *L'vov* Pedagogical Institute
21PP; 21XX; 21YX; 21YZ
Extension-Correspondence
Total: E (1957)–2892

XVIII–96. *Magnitogorsk* Pedagogical Institute
21XY; 21YY
Evening
Extension-Correspondence
Total: E (1955)–1717; G (1956)–233

XVIII–97. Mari Pedagogical Institute (of N.K. Krupskaia) in *Ioshkar-Ola*
21PQ; 21PR; 21QQ; 21XX; 21YY; 21ZX
Extension-Correspondence

XVIII–98. Mari Women's Pedagogical Institute (of I.V. Stalin) in *Ioshkar-Ola*
21PP; 21XY; 21ZX

XVIII–99. *Melekess* Pedagogical Institute
21QQ; 21XY; 21YY
Extension-Correspondence

XVIII–100. *Melitopol'* Pedagogical Institute
21ZX
Extension-Correspondence

XVIII–101. *Minsk* Pedagogical Institute (of M. Gor'kii)
2113; 21PP; 21QQ; 21XX; 21YX; 21YZ; 21ZY
Extension-Correspondence

XVIII–102. *Michurinsk* Pedagogical Institute
21XX; 21ZX
Extension-Correspondence

XVIII–103. *Mogilev* Pedagogical Institute
21PP; 21QQ; 21XX; 21YY; 21ZY
Extension-Correspondence

XVIII–104. *Moscow* City Pedagogical Institute (of V.P. Potemkin)
Advanced Degrees: C, D
2107; 2109; 21QQ; 21XX; 21YX; 21YZ; 21ZX
Evening

XVIII–105. *Moscow* State Pedagogical Institute (of V.I. Lenin)
Advanced Degrees: C, D
2103; 2110; 2111+2101; 2111+2104; 21XX; 21YX; 21YZ 21ZX

XVIII–106. *Moscow* Regional Pedagogical Institute (of N.K. Krupskaia)
Advanced Degrees: C
21XY; 21YX; 21YZ; 21ZX; 21ZY; 21ZZ
Extension-Correspondence

XVIII–107. *Murmansk* Pedagogical Institute
21XX; 21YY
Extension-Correspondence

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XVIII–108. *Murom* Pedagogical Institute
21XX; 21YZ
Extension-Correspondence
Total: E (1957)–1099; G (1957)–105

XVIII–109. *Namangan* Pedagogical Institute
2101; 21PP; 21QQ; 21YY

XVIII–110. *Nezhin* Pedagogical Institute of N.V. Gogol')
2101a; 2102a; 21YY; 21ZX
Extension-Correspondence

XVIII–111. *Nizhnii Tagil* Pedagogical Institute
21PT; 21PX; 21XY; 21YY
Extension-Correspondence

XVIII–112. *Nikolaev* Pedagogical Institute (of V.G. Belinski)
2101a; 21YY; 21ZZ
Extension-Correspondence

XVIII–113. *Novgorod* Pedagogical Institute
2101+2108; 21XX; 21YY
Evening
Extension-Correspondence
Total: E (1956)–2310; G (1956)–117

XVIII–114. *Novozybkov* Pedagogical Institute
21XY; 21YY; 21ZX
Extension-Correspondence

XVIII–115. *Novosibirsk* Pedagogical Institute
2103; 21XX; 21YX; 21YZ; 21ZY
Extension-Correspondence

XVIII–116. *Odessa* Pedagogical Institute (of K.D. Ushinski)
2101a; 2102a; 21YX; 21YZ; 21ZZ
Extension-Correspondence

XVIII–117. *Omsk* Pedagogical Institute (of M. Gor'kii)
2103; 21XX; 21YX; 21YZ; 21ZX
Extension-Correspondence
Total: E (1956)–3657

XVIII–118. *Orekhovo-Zuevo* Pedagogical Institute
21XY; 21YY; 21ZX
Extension-Correspondence

XVIII–119. *Orenburg* Pedagogical Institute (of V.P. Chkalov)
2103; 21XX; 21YX; 21YZ; 21ZY
Extension-Correspondence

XVIII–120. *Orlov* Pedagogical Institute
2103; 21QQ; 21XX; 21YX; 21YZ; 21ZX
Extension-Correspondence
Total: A (1956)–556; E (1956)–4292

XVIII–121. *Orsk* Pedagogical Institute
21XY; 21YY
Extension-Correspondence

XVIII–123. *Osh* Pedagogical Institute
2101; 2103; 21XY; 21YY; 21YZ; 21ZX
Extension-Correspondence

XVIII–124. *Penza* Pedagogical Institute (of V.G. Belinski)
21XX; 21YY; 21ZY; 21ZZ
Extension-Correspondence
Total: E (1956)–5571; G (1956)–599

XVIII–125. *Perm'* Pedagogical Institute
21PQ; 21QQ; 21XY; 21YX; 21YZ; 21ZZ
Extension-Correspondence

XVIII–126. *Petropavlovsk* Pedagogical Institute (of K. D. Ushinski)
21XX; 21YY; 21ZY
Extension-Correspondence
Regular: E (1956)–617

XVIII–127. *Poltava* Pedagogical Institute (of V.G. Korolenko)
2101a; 21PP; 21YY; 21YZ; 21ZX
Extension-Correspondence

XVIII–128. *Przheval'sk* Pedagogical Institute
2101; 21XY; 21YY; 21YZ

XVIII–129. *Pskov* Pedagogical Institute (of S.M. Kirov)
21XX; 21YY; 21ZX
Extension-Correspondence

XVIII–130. *Piatigorsk* Pedagogical Institute
2103 (English); 2103 (German); 2103 (French); 21PQ;
Extension-Correspondence

XVIII–132. *Rovno* Pedagogical Institute
2102a; 21QQ; 21XX; 21YY
Extension-Correspondence

XVIII–133. *Rostov* Pedagogical Institute
2103; 2110; 21XY; 21YX; 21YZ; 21ZX; 21ZZ
Extension-Correspondence

XVIII–135. *Riazan'* Pedagogical Institute
2103; 21XX; 21YX; 21YZ; 21ZX
Extension-Correspondence
Total: E (1956)–3285 G (1956)–478

XVIII–136. *Saratov* Pedagogical Institute
Advanced Degrees: C
2103; 21XY; 21YX; 21YZ; 21ZX; 21ZZ
Extension-Correspondence

XVIII–137. *Sverdlovsk* Pedagogical Institute
2103; 21QQ; 21XX; 21YX; 21YZ; 21ZY
Extension-Correspondence

XVIII–138. North-Osetin Pedagogical Institute (of K.L. Khatagurov) in *Ordzhonikidze*
21PQ; 21XY; 21YX; 21YZ; 21ZX; 21ZZ
Extension-Correspondence

XVIII–139. *Semipalatinsk* Pedagogical Institute (of N.K. Krupskaia)
21PQ; 21QQ; 21XX; 21YY; 21YZ; 21ZX
Extension-Correspondence
Regular: E (1956)–821

XVIII–140. *Slaviansk* Pedagogical Institute
21QQ; 21YY
Extension-Correspondence

XVIII–141. *Smolensk* Pedagogical Institute (of Karl Marx)
2103; 21PW; 21XX; 21YX; 21YZ; 21ZY
Extension-Correspondence
Total: E (1957)–4912; G (1957)–641

XVIII–142. *Stavropol'* Pedagogical Institute
21PQ; 21PW; 21XX; 21YX; 21YZ; 21ZY; 21ZZ
Extension-Correspondence

XVIII–143. *Stalinabad* Pedagogical Institute (of T.G. Shevchenko)
2101; 2103; 2110; 21PP; 21QQ; 21YY; 21YZ; 21ZX; 21ZY; 21ZZ
Extension-Correspondence

XVIII–144. *Stalingrad* Pedagogical Institute (of A.S. Serafimovich)
2103; 21XX; 21YX; 21YZ; 21ZX; 21ZY
Extension-Correspondence
Total: E (1955)–4513; G (1956)–660

XVIII–145. *Staliniri* Pedagogical Institute
21PP; 21PQ; 21QQ; 21XX; 21YY; 21ZY

XVIII–146. *Stalino* Pedagogical Institute
21PP; 21XX; 21YX; 21YZ
Extension-Correspondence

XVIII–147. *Stalinsk* Pedagogical Institute
21XY; 21YY; 21ZY
Extension-Correspondence

XVIII–148. *Stanislav* Pedagogical Institute
2102a; 21QQ; 21XX; 21YY
Extension-Correspondence

XVIII–149. *Sterlitamak* Pedagogical Institute
21PQ; 21XX; 21YY
Extension-Correspondence

XVIII–150. *Sumy* Pedagogical Institute
21PR; 21XY; 21YY; 21ZX
Extension-Correspondence

XVIII–151. *Sukhumi* Pedagogical Institute (of M. Gor'kii)
21PP; 21PQ; 21PR; 21QQ; 21XX; 21YY; 21ZY
Evening
Total: E (1956)–1028; G (1956)–293

XVIII–152. *Taganrog* Pedagogical Institute
21QQ; 21XY; 21YY
Extension-Correspondence

XVIII–153. *Tallin* Pedagogical Institute (of E. Vil'de)
21QQ
Extension-Correspondence
Total: E (1956)–1873

XVIII–154. *Tambov* Pedagogical Institute
21XY; 21YX; 21YZ; 21ZY; 21ZZ
Evening
Extension-Correspondence

XVIII–155. *Tashauz* Pedagogical Institute

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21XY; 21YY; 21YZ; 21ZX; 21ZY
Extension-Correspondence

XVIII–156. *Tashkent* Pedagogical Institute (of Nizami)
2101; 2109; 2110; 21PP (Kazakh); 21PP (Uzbek); 21PQ; 21QQ; 21YX; 21YY; 21YZ; 21ZX; 21ZY; 21ZZ
Extension-Correspondence

XVIII–156A. *Tashkent* Evening Pedagogical Institute (of V.G. Belinski)
2101; 2105; 2107; 2110; 21PP; 21QQ; 21YY

XVIII–157. *Tbilisi* Pedagogical Institute (of A.S. Pushkin)
Advanced Degrees: C
2101; 2113; 21PQ; 21QQ; 21YY; 21YZ; 21ZX; 21ZY
Evening
Extension-Correspondence

XVIII–158. *Telavi* Pedagogical Institute
21PP; 21QQ; 21XX; 21YY

XVIII–159. *Termez* Pedagogical Institute
2101; 21PP; 21YY; 21ZX

XVIII–160. *Tiraspol'* Pedagogical Institute (of T.G. Shevchenko)
2101; 21YY; 21ZX; 21ZY
Extension-Correspondence

XVIII–161. *Tobol'sk* Pedagogical Institute
21PQ; 21XY; 21YY
Extension-Correspondence

XVIII–162. *Tomsk* Pedagogical Institute
2103; 21PQ; 21YX; 21YZ; 21ZX; 21ZZ
Extension-Correspondence
Total: E (1956)–2363; G (1956)–264

XVIII–163. *Tula* Pedagogical Institute
21XX; 21YX; 21YZ
Extension-Correspondence

XVIII–164. *Tiumen'* Pedagogical Institute
2103; 21XX; 21YX; 21YZ; 21ZX
Extension-Correspondence

XVIII–165. Udmur Pedagogical Institute (of the 10th anniversary of the Udmur Autonomous Region) in *Izhevsk*
2103; 21PR; 21XX; 21YX; 21YZ; 21ZX; 21ZZ
Extension-Correspondence
Total: E (1956)–3087; G (1956)–502

XVIII–166. *Ul'ianovsk* Pedagogical Institute
21XX; 21YX; 21YZ; 21ZX
Extension-Correspondence

XVIII–167. *Uman'* Pedagogical Institute
21YX; 21YZ; 21ZX
Extension-Correspondence

XVIII–168. *Ural'sk* Pedagogical Institute (of A.S. Pushkin)
2110; 21PP; 21PQ; 21QQ; 21XX; 21YX; 21YZ; 21ZX; 21ZY
Extension-Correspondence
Regular: E (1956)–1843

XVIII–169. *Ust'-Kamenogorsk* Pedagogical Institute
21QQ; 21XX; 21YY; 21YZ; 21ZX
Extension-Correspondence
Regular: E (1956)–952

XVIII–170. *Ussuriisk* Pedagogical Institute
21XY; 21YY; 21YZ
Extension-Correspondence

XVIII–171. *Fergana* Pedagogical Institute
2101; 21PP; 21YX; 21YZ; 21ZX; 21ZY; 21ZZ
Extension-Correspondence

XVIII–172. *Khabarovsk* Pedagogical Institute
2103; 21PX; 21XX; 21YX; 21YZ; 21ZX; 21ZY; 21ZZ; (special division for the training of teachers of the nationalities of the North)
Evening
Extension-Correspondence

XVIII–173. *Khar'kov* Pedagogical Institute (of G.S. Skovoroda)
21ZZ
Extension-Correspondence

XVIII–174. *Kherson* Pedagogical Institute (of N.K. Krupskaia)
2101a; 2102a; 21YX; 21YZ; 21ZX
Extension-Correspondence

XVIII–175. Khorezm Pedagogical Institute in *Urgench*
2101; 21PP; 21QQ; 21YY

XVIII–176. *Chardzhou* Pedagogical Institute
2101; 2103; 21QQ; 21YY; 21YZ; 21ZX; 21ZY
Extension-Correspondence
Total: E (1956)–3074; G (1956)–381

XVIII–177. *Cherepovets* Pedagogical Institute
21QQ; 21XY; 21YY
Extension-Correspondence

XVIII–178. *Cheliabinsk* Pedagogical Institute
21PW; 21XX; 21YX; 21YZ; 21ZY; 21ZZ
Evening
Extension-Correspondence
Total: E (1955)–3929; G (1956)–607

XVIII–179. *Cherkassy* Pedagogical Institute (of the 300th anniversary of the Reunion of the Ukraine with Russia)
21PR; 21XY; 21YY; 21YZ; 21ZX; 21ZZ
Extension-Correspondence

XVIII–180. *Chernigov* Pedagogical Institute
21QQ; 21YY
Extension-Correspondence

XVIII–181. Checheno-Ingush Pedagogical Institute in *Groznyi*
21PQ (Chechen); 21PQ (Ingush); 21XX; 21XY; 21YY; 21ZZ
Extension-Correspondence
Total: E (1956)–3140

XVIII–182. *Chimkent* Pedagogical Institute (of N.K. Krupskaia)
21PQ; 21XX; 21YY; 21YZ
Extension-Correspondence
Regular: E (1956)–775

XVIII–183. *Chita* Pedagogical Institute
2103; 21XX; 21YY; 21ZY
Extension-Correspondence

XVIII–184. Chuvash Pedagogical Institute in *Cheboksary*
21PQ; 21PR; 21XX; 21XY; 21YZ; 21ZX
Extension-Correspondence

XVIII–185. *Shadrinsk* Pedagogical Institute
21XY; 21YY
Extension-Correspondence
Total: E (1956)–1250

XVIII–186. *Shiaulai* Pedagogical Institute
2101; 2102; 21QQ; 21YX; 21YZ
Extension-Correspondence
Total: E (1956)–676; G (1956)–none

XVIII–187. *Shakhty* Pedagogical Institute
21XX; 21YY
Extension-Correspondence
Total: E (1955)–595; G (1955)–none

XVIII–188. *Shuia* Pedagogical Institute
21QQ; 21XX; 21YY

XVIII–189. Southern-Sakhalin Pedagogical Institute in *Iuzhno-Sakhalinsk*
21XX; 21YY; 21ZY
Extension-Correspondence

XVIII–190. *Iaroslavl'* Pedagogical Institute (of K.D. Ushinski)
Advanced Degrees: C
2103; 21XX; 21YX; 21YZ; 21ZY
Extension-Correspondence
Total: E (1956)–3721

B. *Pedagogical Institutes of Foreign Languages*

XVIII–193. *Gor'kii* Pedagogical Institute of Foreign Languages
2103 (English and German); 2103 (German and English); 2103 (French and German)
Extension-Correspondence

XVIII–194. *Gorlovka* Pedagogical Institute of Foreign Languages
21PR (English and Ukrainian); 21PR (French and Ukrainian); 21PZ
Extension-Correspondence

XVIII–195. *Irkutsk* Pedagogical Institute of Foreign Languages
2103 (English and German); 2103 (German and English); 2103 (French and German)
Total: E (1955)–1072; G (1955)–201

XVIII–196. *Kiev* Pedagogical Institute of Foreign Languages
2103 (German and English); 2103 (French and German);

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2103b; 21PZ
Extension-Correspondence

XVIII–197. *Minsk* Pedagogical Institute of Foreign Languages
2103; 21PR (German and Belorussian); 21PR (French and Belorussian); 21XY (German and Russian); 21XY (French and Russian)
Extension-Correspondence

XVIII–198. First *Moscow* Pedagogical Institute of Foreign Languages
Advanced Degrees: C; D
(There are two divisions indicated: one for translators, the other for teachers of foreign languages)
2103 (English; German; French; Spanish; Italian); 2103 (English; German; French)
Evening
Extension-Correspondence

XVIII–199. *Odessa* Pedagogical Institute of Foreign Languages
21PZ
Extension-Correspondence

XVIII–200. *Tashkent* Pedagogical Institute of Foreign Languages
2103 (English and German); 2103 (French and German); 2103 (German and English); 21PR (German and Uzbek); 21PR (French and Uzbek)
Extension-Correspondence

XVIII–201. *Tbilisi* Pedagogical Institute of Foreign Languages
2103 (English and German); 2103 (English and French); 2103 (French and English); 2103 (German and French)
Evening

XVIII–202. *Khar'kov* Pedagogical Institute of Foreign Languages (of N.K. Krupskaia)
21PZ
Extension-Correspondence

C. *Library, Literature and Historic-Archive Institutes*

XVIII–203. *Leningrad* State Library Institute (of N.K. Krupskaia)
2112; 2113
Evening
Extension-Correspondence

XVIII–204. *Moscow* State Library Institute
Advanced Degrees: C
2112; 2113
Evening
Extension-Correspondence

XVIII–205. *Khar'kov* State Library Institute
2112; 2113
Extension-Correspondence

XVIII–206. *Moscow* Institute of Literature (of M. Gor'kii)
Advanced Degrees: C
2028
Extension-Correspondence

XVIII–207. *Moscow* State Historical-Archive Institute
2009
Evening
Extension-Correspondence

D. *Teachers' Institutes*

XVIII–208. *Novo-Vil'nia* Teachers' Institute
2003; 2106+2107; 2108; 21YY
Total: E (1956)–280; G (1956)–312
(This is the only remaining 2-year teachers institute still operating in 1959. The others have all been closed.)

INDEPENDENT EXTENSION-CORRESPONDENCE INSTITUTES

II. POLYTECHNICAL AND INDUSTRIAL INSTITUTES

Ex II–1. All-Union Extension-Correspondence Polytechnical Institute in *Moscow*
Advanced Degrees: C
IIee: 0101; 0105; 0107; 0108; 0201; 0202; 0204; 0206; 0304; 0506
IIkk: 0103; 0205; 0508; 0801
IIbb: 0401; 0402; 0403; 0404; 0407; 0408
IIx: 0501
IIb: 0510; 0511; 0513; 1609
IIf: 0516; 0802; 0805; 0806; 0807; 0808; 0809; 0810; 0811; 0812
IIrr: 0301; 0303; 0305; 0308; 0601
III: 0606; 0611; 0612; 0704
IIh: 1202; 1203; 1206; 1207; 1208; 1209; 1211
IIo: 1705; 1706; 1707; 1708; 1709; 1711; 1721

Ex II–2. North-Western Extension-Correspondence Polytechnical Institute in *Leningrad*
Advanced Degrees: none
IIgg: 0101; 0202
IIww: 0514; 0525
IIx: 0506; 0513; 0516; 0531; 1609
IIaa: 0501
IIbb: 0401; 0404; 0407; 0408; 0504
IIuu: 0606; 0611; 0701; 0704
IIt: 0305; 0308; 0520; 0521
IIj: 0301; 0303; 0601
IIf: 0803; 0805; 0806; 0807; 0812

Ex II–3. Ukrainian Extension-Correspondence Polytechnical Institute in *Khar'kov*
IIee: 0204; 0201; 0206
IIbb: 0403; 0404; 0407
IIx: 0501; 0502; 0503; 0504; 0505; 0506; 0510; 0516; 0513
IIrr: 0301; 0303; 0304; 0305; 0308
III: 0601; 0606; 0611; 0612; 0701; 0704; 0531
IIh: 1202; 1203; 1206; 1207; 1208; 1209; 0511
IIf: 0802; 0803; 0806; 0807; 0808; 0809; 0810; 0811; 0812
IIo: 1705; 1707; 1709; 1708; 1711; 1721
Extension division in *Konstantinovka*

Ex II–3a. Branch in *Dnepropetrovsk*

Ex II–3b. Branch in *Kramatorsk*

III. INSTITUTES OF POWER AND ELECTRICAL ENGINEERING, RADIO-ENGINEERING, AND ENGINEERING-PHYSICS

Ex III–1. All-Union Extension-Correspondence Power Engineering Institute in *Moscow*
Advanced Degrees: none
IIt: 0305; 0308
IIj: 0301; 0307
IIk: 0303; 0601; 0603; 0611
III: 0606; 0608; 0611
IIuu: 0701; 0704
Divisions in: *Kirov, Novosibirsk, Tashkent*

IV. INSTITUTES OF MACHINEBUILDING, SHIPBUILDING, AVIATION ENGINEERING, PRINTING-PUBLISHING AND CINEMA ENGINEERING

Ex IV–1. All-Union Extension-Correspondence Machine-Construction Institute in *Moscow*
Advanced Degrees: none
IIy: 0501
IIvx: 0531
IVaa: 0512; 0521; 0526
IIc: 0513; 0523
IVa: 05XX; 05XY
IVs: 0407; 0502; 0503; 0504

Ex IV–2. *Moscow* Extension-Correspondence Printing-Publishing Institute
Advanced Degrees: none
IIy: 0515
IIyy: 1109
IVk: 2027
IVh: 2220
IIo: 1712

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V. GEOLOGICAL, MINING, PETROLEUM, PEAT, AND METALLURGICAL INSTITUTES

Ex V–1a. Division of Moscow Petroleum Engineering Institute (of I.M. Gubkin) in *Al'met'evka (Tatar ASSR)*
No specialties listed

VI. INSTITUTES OF CHEMICAL TECHNOLOGY

Ex. VI–1. Division of Kazan' Chemical Technology Institute in *Kemerovo*
No specialties listed

VII. FOOD TECHNOLOGY AND FISH INDUSTRY INSTITUTES

Ex VII–1. All-Union Extension-Correspondence Institute of Food Industry in *Moscow*
Advanced Degrees: none
No divisions listed: 0517; 1001; 1002; 1003; 1004; 1005; 1006; 1007; 1008; 1718
Ex VII–1a. Branch of the All-Union Extension-Correspondence Institute of Food Industry in *Armavir*
Ex VII–1b. Branch in *Alma-Ata*
Ex VII–1d. Branch in *Krasnoiarsk*
No specialties listed
Ex VII–2. Central Extension-Correspondence Institute of Fish Industry in *Moscow*
No divisions or specialties listed
Ex VII–2a. Branch of the Central Extension-Correspondence Institute of Fish Industry in *Rostov-on-Don*
Ex VII–2b. Branch in *Murmansk*
Ex VII–2c. Branch in *Riga*

VIII. INSTITUTES OF LIGHT INDUSTRY

Ex VIII–1. All-Union Extension-Correspondence Institute of Textiles and Light Industry in *Moscow*
Advanced Degrees: none
IIyy: 1101; 1102; 1105; 1108
IIf: 1103; 1104; 1106; 1107
IIz: 0308; 0518
IIo: 1714

IX. CONSTRUCTION, GEODESY, AND ROAD BUILDING INSTITUTES

Ex IX–1. All-Union Extension-Correspondence Construction Engineering Institute in *Moscow*
IIh: 1202
IIyy: 0806; 1207
IIz: 0511; 0516
IXg: 1211
IXi: 1203; 1208; 1209
IXj: 1205; 1206
IIo: 1711; 1721; 1722
Ex IX–1a. Branch of the All-Union Extension-Correspondence Construction Engineering Institute in *Alma-Ata*
Ex IX–1b. Branch in *Irkutsk*
Ex IX–1c. Branch in *Krasnodar*
No divisions or specialties listed
Ex IX–2. All-Union Extension-Correspondence Highway Engineering-Automotive Transport Institute in *Saratov*
IIb: 0511; 1609
IXg: 1202; 1211; 1212

XI. TRANSPORT AND COMMUNICATION INSTITUTES

Ex XI–1. All-Union Extension-Correspondence Engineering Institute of Railway Transport in *Moscow*
IIz: 0511; 0512; 0527
IIm: 0305; 1603
XIj: 1604
IIh: 1202; 1210; 1212
IIo: 1721; 1723

Ex XI–2. All-Union Extension-Correspondence Electrotechnical Communication Institute in *Moscow*
XIk: 0703
XIn: 0702
IIo: 1728

XII. AGRICULTURAL AND FORESTRY INSTITUTES

Ex XII–1. All-Union Extension-Correspondence Forestry Engineering Institute in *Leningrad*
0519; 0901; 0902; 0903; 1512; 1719; 1720
Ex XII–2. All-Union Extension-Correspondence Agricultural Institute in *Balashikha*
1502; 1503; 1509; 1510; 1511; 1715; 1737

XIII. ECONOMICS (MANAGEMENT) INSTITUTES

Ex XIII–1. All-Union Extension-Correspondence Economics Institute in *Moscow*
XIIIr: 1701; 1704
XIIIm: 1702
XIIIb: 1716
XIIIo: 1703
XIIIg: 1736
XIIIa: 1737
XIIIl: 1702
Ex XIII–1a. Branch of the All-Union Extension-Correspondence Economics Institute in *Alma-Ata*
Ex XIII–1b. Branch of the All-Union Extension-Correspondence Economics Institute in *Ashkhabad*
Ex XIII–1c. Branch of the All-Union Extension-Correspondence Economics Institute in *Voronezh*
Ex XIII–1d. Branch of the All-Union Extension-Correspondence Economics Institute in *Gor'kii*
Ex XIII–1e. Branch of the All-Union Extension-Correspondence Economics Institute in *Kemerovo*
Ex XIII–1f. Branch of the All-Union Extension-Correspondence Economics Institute in *Kursk*
Ex XIII–1g. Branch of the All-Union Extension-Correspondence Economics Institute in *Moscow*
Ex XIII–1h. Branch of the All-Union Extension-Correspondence Economics Institute in *Novosibirsk*
Ex XIII–1i. Branch of the All-Union Extension-Correspondence Economics Institute in *Penza*
Ex XIII–1j. Branch of the All-Union Extension-Correspondence Economics Institute in *Sverdlovsk*
Ex XIII–1k. Branch of the All-Union Extension-Correspondence Economics Institute in *Ufa*
Ex XIII–1l. Branch of the All-Union Extension-Correspondence Economics Institute in *Frunze*
Ex XIII–1m. Branch of the All-Union Extension-Correspondence Economics Institute in *Khabarovsk*
Ex XIII–1n. Branch of the All-Union Extension-Correspondence Economics Institute in *Iaroslavl'*
Ex XIII–3. All-Union Institute of Soviet Trade in *Moscow*
1011; 1729; 1732; 1733; 1737
Ex XIII–3a. Branch of the All-Union Institute of Soviet Trade in *Alma-Ata*
Ex XIII–3b. Branch of the All-Union Institute of Soviet Trade in *Baku*
Ex XIII–3c. Branch of the All-Union Institute of Soviet Trade in *Kazan'*
Ex XIII–3d. Branch of the All-Union Institute of Soviet Trade in *Irkutsk*
Ex XIII–3e. Branch of the All-Union Institute of Soviet Trade in *Kishinev*
Ex XIII–3f. Branch of the All-Union Institute of Soviet Trade in *Kuibyshev*
Ex XIII–3g. Branch of the All-Union Institute of Soviet Trade in *Moscow*
Ex XIII–3h. Branch of the All-Union Institute of Soviet Trade in *Novosibirsk*
Ex XIII–3i. Branch of the All-Union Institute of Soviet Trade in *Rostov-on-Don*
Ex XIII–3j. Branch of the All-Union Institute of Soviet Trade in *Saratov*

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Ex XIII–3k. Branch of the All-Union Institute of Soviet Trade in *Sverdlovsk*
Ex XIII–3l. Branch of the All-Union Institute of Soviet Trade in *Tashkent*
Ex XIII–3m. Branch of the All-Union Institute of Soviet Trade in *Tbilisi*

XIV. INSTITUTES OF JURISPRUDENCE

Ex XIV–1. All-Union Extension-Correspondence Juridical Institute (VIuZI) in *Moscow*
1801
Ex XIV–1a. Branch of the All Union Extension-Correspondence Juridical Institute in *Voronezh*
Ex XIV–1b. Branch of the All Union Extension-Correspondence Juridical Institute in *Gor'kii*
Ex XIV–1c. Branch of the All Union Extension-Correspondence Juridical Institute in *Ivanovo*
Ex XIV–1f. Branch of the All Union Extension-Correspondence Juridical Institute in *Kishinev*
Ex XIV–1g. Branch of the All Union Extension-Correspondence Juridical Institute in *Kuibyshev*
Ex XIV–1h. Branch of the All Union Extension-Correspondence Juridical Institute in *Moscow*
Ex XIV–1i. Branch of the All Union Extension-Correspondence Juridical Institute in *Novosibirsk*
Ex XIV–1k. Branch of the All Union Extension-Correspondence Juridical Institute in *Odessa*
Ex XIV–1m. Branch of the All Union Extension-Correspondence Juridical Institute in *Ufa*
Ex XIV–1n. Branch of the All Union Extension-Correspondence Juridical Institute in *Khabarovsk*
Ex XIV–1o. Branch of the All Union Extension-Correspondence Juridical Institute in *Krasnodar*
Ex XIV–1p. Branch of the All Union Extension-Correspondence Juridical Institute in *Chita*

XVIII. PEDAGOGICAL, LIBRARY, HISTORICAL-ARCHIVE AND LITERATURE HIGHER EDUCATIONAL INSTITUTES

Ex XVIII–2. Armenian Extension-Correspondence Pedagogical Institute in *Erevan*
2101; 2102; 2106; 2107; 2108; 2113; 21YY
Ex XVIII–3. Kirgiz Extension-Correspondence Pedagogical Institute in *Frunze*
2101; 2102; 2107; 2108
Ex XVIII–4. *Moscow* Extension-Correspondence Pedagogical Institute
2101; 2106; 2107; 2108; 2109; 2110; 2111; 21QQ; 21YY

SUPPLEMENT TO APPENDIX IV–B–3.—*List of Soviet military higher educational establishments of the academy type*

Soviet sources are obviously secretive about releasing comprehensive data on the educational institutions of the military establishment of the U.S.S.R. The list of Soviet military academies below is by no means exhaustive. Furthermore, since it has been compiled from Soviet sources of different dates, there is no certainty about whether it is up-to-date. The roster of Soviet academies compiled is as follows:

I. *Command Staff and Political Officers Establishments*

1. General Staff (*Akademiia General'nogo Shtaba*[b], which is also known as *Vysshaia Voennaia Akademiia im. K. Voroshilova*)[a]. Advanced degree offerings: candidate.
2. Command and Political (*Voennaia Akademiia Krasnoi Armii im. M. Frunze*).[a b] Advanced degree offering: candidate.
3. Political (*Vysshie Voenno-Politicheskii Kursy*[a], which is also known as *Voenno-Politicheskaia Akademiia im. V. Lenina*)[b]. Advanced degree offering: candidate and doctor. 1960 information indicates this to be in existence under the name of *Voenno-Politicheskaia Akademiia imeni Lenina.*
4. Air (command) and Air Navigation (*Voennaia Akademiia Komandnogo i Shturmanskogo Sostova Voenno-Vozdushnykh sil Krasnoi Armii*)[a b]. Advanced degree offering: candidate.
5. Air (command) (*Voenno-Vozdushnaia Akademiia Krasnoi Armii*, in Leningrad).[a] Advanced degree offering: candidate and doctor. 1960 information indicates the name as *Leningradskaia Voenno-Vozdushnaia Inzhenernaia Akademiia imeni A. F. Mozhaiskogo*, which suggests it is an air force engineering academy and therefore should be properly classified in Section II below.
6. Naval (command) (*Voenno Morskaia Akademiia Krasnoi Armii im. K. Voroshilova*).[a] Advanced degree offering: candidate and doctor.
7. Supply and Administration (*Voenno-Khoziaistvennaia Akademiia im. V. Molotova*),[b] which is also known as *Voennaia Akademiia Tyla i Snabzheniia Krasnoi Armii im. V. Molotova*).[a] Advanced degree offering: candidate. 1960 information indicates this to be in existence under the name of *Voennaia Akademiia Tyla i Transporta.*
8. Military Justice (*Voenno-Iuridicheskaia Akademiia Krasnoi Armii*).[b] Advanced degree offering: unknown.

II. *Engineering-Oriented*

9. Air Engineering (*Voenno-Vozdushnai Inzhenernaia Ordena Lenina Akademiia Krasnoi Armii im. N. Zhukovskogo*).[a] Advanced degree offering: candidate and doctor.
10. Military Engineering (*Voenno-Inzhenernaia Akademiia im. V. Kuibysheva*).[b] Advanced degree offering: unknown.
11. Armored and Mechanized Forces (*Voennaia Ordena Lenina Akademiia Bronetankovykh i Mekhanizirovannykh Voisk im. I Stalina*).[a b] Advanced degree offering: candidate and doctor.
12. Artillery (*Voenno-Artilleriiskaia Ordena Lenina Akademiia Krasnoi Armii im. F. Dzerzhinskogo*).[a b] Advanced degree offering: candidate and doctor.
13. Chemical Warfare (*Voennaia Akademiia Khimicheskoi Zashchity Krasnoi Armii im. K. Voroshilova*).[a] Advanced degree offering: candidate and doctor.
14. Electrical Engineering of Communications (*Voenno-Elektrotekhnicheskaia Akademiia Sviazi Krasnoi Armii im. S. Budenogo*).[a b] Advanced degree offering: candidate and doctor. Definitely in existence in 1960.
15. Construction Engineering (*Vysshee Voenno-Inzhenernoe Stroitel'noe Uchilishche Krasnoi Armii,*[b] also known as *Voenno-Inzhenernaia Akademiia im. V. Kuibysheva*).[a] Advanced degree offering: candidate and doctor.
16. Transport (*Voenno-Transportnaia Akademiia Krasnoi Armii im. L. Kaganovicha*).[a b] Advanced degree offering: candidate. [It is not clear whether this academy has been consolidated with I–7 above.]
17. Naval Engineering (Shipbuilding and Armaments) (*Vysshee Inzhenernoe Tekhnicheskoe Uchilishche Voenno-Morskogo Flota*).[a] Advanced degree offering: candidate and doctor.
18. Naval Construction Engineering (*Vysshee Voenno-Morskoe Inzhenernoe Uchilishche im. F. Dzerzhinskogo,* which is also known as *Voenno-Morskoe Inzhenerno-Stroitel'noe Uchilishche*).[a b] Advanced degree offering: candidate.

III. *Other Professional*

19. Medical (*Voenno-Meditsynskaia Akademiia Krasnoi Armii im. S. Kirova*).[a b] Advanced degree offering: candidate and doctor. 1960 information indicates the name of the military academy as listed above.
20. Medical in Kuibyshev (*Voenno-Meditsynskaia Akademiia,* in Kuibyshev).[b] Advanced degree offering: unknown.

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21. Naval Medical (*Voenno-Morskaia Meditsynskaia Akademiia*).[a] Advanced degree offering: candidate and doctor.
22. Veterinary (*Voenno-Veterinarnaia Akademiia Krasnoi Armii*).[a,b] Advanced degree offering: candidate and doctor.

SOURCES AND NOTES

[a] Listing of academies from *Vyshko SPR–1945*, pp. 250, 255, which indicates whether degrees of candidate and doctor are offered.

[b] Listing of academies from *Sbornik zakonov, postanovlenii i rasporiazhenii pravitel'stva SSSR*, 1940, p. 328, which indicates where deposit libraries exist at educational establishments, which establishments are mandatory recipients of such materials. Later listings of institutions offering advanced degree training (*VyShkoSPR–1948*, pp. 329–41, and *VyShkoSPR–1957*, pp. 310–19) *omit* the identification of institutions of the military establishment of the U.S.S.R. However, although indicating that this information is "secret," the 1957 source (*VyShkoSPR–1957*, pp. 314 and 318) assigns numbers to the individual establishments. On the basis of this information, it can be deduced that in 1956 there were at least 17 establishments of the Ministry of Defense which offered training and awarded doctor's degrees, and 25 establishments of the Ministry of Defense and Ministry of the Armaments Industry which offered training and awarded candidate's degrees. *Thus in 1956 there were definitely upwards of 25 higher educational establishments of the academy type run by the military establishment of the U.S.S.R.*

In 1939 and 1945 there were also under the military establishment:

Military Hydrometeorological Institute (*Vysshii Voennyi Gidrometeorologicheskii Institut*), which later became the Central Institute of Weather Forecasting (*Tsentral'nyi Institut Prognozov*).[a] Advanced degree offering: candidate and doctor.

The military also run the Main Geophysical Observatory (*Glavnaia Geofizicheskaia Observatoriia im. H. Voenkova*). Both of these latter institutes are now subordinated to the Chief Administration of Hydrometeorological Service of the Council of Ministers of the U.S.S.R. Another military establishment (naval) was the State Hydrographic Institute (*Gosudarstvennyi Gidrologicheskii Institut*). Its present subordination is unknown, but it is believed that part of its functions were transferred to the Institute of Oceanography of the Academy of Sciences of the U.S.S.R. Another military institute was that of Epidemiology and Hygiene (*Gosudarstvennyi Nauchno Issledovatel'skii Institut Epidemiologii i Gigieny Krasnoi Armii* (*VyshkoSPR–1945*, p. 255), whose functions were definitely transferred in the postwar years to the Academy of Medical Sciences of the U.S.S.R.

Another Western compilation (Korol, *Soviet Education. . .*, p. 141) lists 14 academies, among which the Armament Industrial Academy and the Riga Military Air Engineering Institute are given without source verification. The other 12 institutes listed there represent partial listing from the Soviet sources indicated above.

GENERAL NOTES TO TABLES IV–B–4 through IV–B–21

When *Soviet Professional Manpower* (Appendix to Ch. IV–B series) was being prepared in 1955, there were very few Soviet higher education curricula at hand. In the 5 years since, Western sources have acquired such a generous assortment of the specialties listed in Appendix IV–B–1 that at the latest count by the author there were approximately 500 different Soviet higher education curricula, or curricula for the same specialty but for different years, which had been accumulated by various researchers.

According to the latest inventory of curricula holdings by various research outlets and private individuals, it would appear that about 80 percent of the specialities listed in Appendix IV–B–1 could be matched with the appropriate curriculum. Obviously there is no longer a problem of scarcity to dictate which Soviet higher education programs shall be examined, and rather it is the proper selection of curricula for different specialties, or the same specialty over time, which becomes important.

This study cannot, nor does it intend to, give available curricula for each and every specialty. We were guided in our choice by a desire to present a wide cross-section of representative curricula, some of which have not only been translated into English from various Soviet sources but have also been subjected to analysis by various researchers (see discussion in text, Ch. IV).

The curricula thus selected represent different professional fields, as follows:

1. University programs for researchers or teachers:
   a. Science—physics, chemistry, mechanics (Tables IV–B–4, IV–B–5, IV–B–6)
   b. Humanities—languages and literature (IV–B–7)
   c. Social science—political economy (IV–B–8)
2. Engineering
   a. Electrical (IV–B–9)
   b. Mechanical (IV–B–10, IV–B–11)
   c. Chemical (IV–B–12)
   d. Civil (IV–B–13)
   e. Operations and maintenance (IV–B–14)
   f. Engineering economics and managerial engineering (IV–B–15)
   g. Engineering diploma project requirements (IV–B–16)
3. Agriculture
   a. Agronomy (IV–B–17)
   b. Veterinary medicine (IV–B–18)
4. Medicine (IV–B–19)
5. Pedagogical—for training physics teachers (IV–B–20)
6. Other—programs of Communist Party schools (IV–B–21)

The examples of instruction programs presented below can be multiplied many times, but it is hoped that the samples will be sufficient to give a general idea about the instruction subjects which are required in Soviet higher education programs.

An additional consideration influenced the selection of materials for Tables IV–B–4 through 21. Various researchers have an understandable desire to present the most up-to-date programs of instruction in Soviet higher education. As mentioned in Ch. IV, the new 1963 (or thereabouts) version of Soviet higher education curricula does not exist as yet for all fields, and the Soviet Ministry of Higher

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and Secondary Specialized Education is only now in the process of approving new curricula. A large number of 1955–56 curricula were still in use as of 1958–59. In September 1960 the first set of newly approved curricula, those for most of the university specialties, became available (*Source Y*). Some of these new programs are compared in the tables below with the earlier (1955–56) versions. Students who began their training in the late 1950's continued, as a rule, to receive instruction on the basis of the old curricula, which were adjusted to meet the additional requirement of "work experience."

From the long-run point of view, taking into consideration the historical approach of this study in regard to the question of the gradual growth of specialized manpower resources, we should be just as much concerned with past curricula. Most professionals employed in the Soviet Union today received their training on the basis of these past curricula. Therefore, whenever feasible, the tables below present the earlier versions of Soviet higher education curricula in order to give the reader historical perspective.

Finally, some Soviet higher education programs may be individual, i.e., for specific institutions, while others are general programs, for many schools offering the same specialty. Again, in a number of instances, the individual and the general programs are compared to acquaint the reader with the differences in these two types of programs.

TABLE IV–B–4.—*Physics—University program: Comparison of 1955 and 1959 curricula (Specialty 2016)*

Subjects of instruction	1955 program (5½ years)					1959 program (5½ years)				
	Term	Lecture	Laboratory	Seminar or practice session	Total	Total	Lecture	Laboratory	Seminar or practice session	Term
1. (A) History of Communist Party	.....	.....	.....	.....	none	224	120	.....	104	1–4
(B) Foundations of Marxism-Leninism	1–4	144	.....	80	224	none	.....	.....	.....	.....
2. Political economy	5–8	100	.....	40	140	150	80	.....	70	5–7
3. Dialectical and historical materialism	7–9	80	.....	60	140	140	70	.....	70	7–9
4. History of physics	9	52	.....	.....	52	none	.....	.....	.....	.....
5. Foreign language	1–4	.....	.....	270	270	272	.....	.....	272	1–8
6. Chemistry	1–2	68	34	.....	102	68	28	40	.....	1–2
7. Technical drawing	1–2	.....	68	.....	68	86	18	.....	68	1–2
8. Higher mathematics:										
a. Calculus and analysis	1–4	360	.....	236	616	480	240	.....	240	1–4
b. Analytical geometry and higher algebra.						150	82	.....	68	1–2
c. Methods of mathematical physics	5–6	170	.....	86	256	188	128	.....	60	5–6
d. Problem sessions	5–6	.....	34	.....	34	none	.....	.....	.....	.....
9. Industrial workshop	1–2	.....	68	.....	79	102	102	.....	.....	1–2
10. General physics:										
a. Mechanics, molecular physics, electricity, optics	1–4	236	.....	186	372	372	266	.....	106	1–4
b. Atomic physics	5–6	68	.....	18	86	108	72	.....	36	5
c. Nuclear physics	6–7	68	.....	34	102	64	64	.....	.....	6
d. Problem sessions (for 10 and 12 combined)	1–8	.....	857	.....	857	526	.....	526	.....	1–7
11. Foundations of electrical and radio engineering	5	54	.....	.....	54	120	48	72	.....	4–5
12. Theoretical physics:										
a. Theoretical mechanics	4–5	102	.....	52	154	120	80	.....	40	3–4
b. Field and electron theory (electrodynamics)	5–6	102	.....	34	136	120	100	.....	20	5–6
c. Thermodynamics and statistical physics.	6–7	68	.....	36	104	114	94	.....	20	6–7
d. Quantum mechanics	7–8	93	.....	31	124	125	100	.....	25	7
13. Specialization courses	6–10	345	.....	79	424	470	290	.....	180	6–10
14. Specialization laboratories	8–10	.....	625	.....	625	450	.....	450	.....	6–10
15. Electives within specialized field	.....	.....	.....	.....	none	156	.....	.....	156	10–11
16. Computation techniques and digital computers	.....	.....	.....	.....	none	42	42	.....	.....	10
17. Physical education and sports	1–4	136	.....	136	136	136	.....	.....	136	1–4
Grand total	.....	2,110	1,686	1,348	5,144	4,781	1,922	1,190	1,669	.....

Sources: 1955: *Source X*, loose-leaf program. This program is designated as being offered by physics departments of universities in general, and specifically at Moscow State University. The 1955 curriculum is examined in detail by E. M. Corson, "An Analysis of the 5-Year Physics Program at Moscow State University," *Information on Education Around the World*, U.S. Department of Health, Education and Welfare, Office of Education, Bulletin No. 11, Washington, D.C., February 1959.
1959: *Source Y*, Folio 40.

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SUPPLEMENT TO TABLE IV–B–4.—*Additional Information on Curriculum*

I. *Optional Courses:*

1. Foreign language
2. Physical education
3. Materials technology
4. History of physics
5. Selected topics in contemporary physics
6. Philosophical problems of natural sciences

II. *Specialization Courses and Electives* (1955 curriculum):

1. Specialization: Theoretical and mathematical physics
   - Theory of continuous media
   - Further topics in mathematical physics
   - Further topics in statistical physics
   - Further topics in electrodynamics
   - Quantum electrodynamics
   - Theory of relativity
   - Quantum chemistry
   - Theory of elementary particles
   - The atomic nucleus
   - Quantum theory of fields
   - Special seminar
   - Theoretical physics seminar
   - Qualitative theory of differential equations
   - Theory of functions of a real variable
   - Integral equations
   - Elliptic differential equations
   - Hyperbolic differential equations
   - Operational calculus
   - Analytic theory of differential equations
   - Computational techniques
2. Specialization: Physics of solid state
   - Fundamentals of crystallography and X-rays
   - Structure analysis
   - Physico-chemical analysis
   - Roentgenography of metals
   - Special topics in physics of X-rays
   - Theory of solids
   - Electron theory of metals
   - Special topics in crystal chemistry
   - Physics of semiconductors
   - Semiconductor devices
   - Elements of high frequency technology
   - Theory of transformers (regenerators)
   - Theory of elementary particles
   - Magnetic analysis of structured materials
   - Technology of semiconductors
   - Crystallography
   - Growth of crystals
   - Crystal optics
   - Crystal physics
   - Alternating currents
   - Electromagnetic and magnetic measurements
   - Ferromagnetism
   - Physics of metals
   - Magnetic analysis
   - Quantum theory of metals
   - Special topics in quantum statistics
   - Special methods of measurement
   - Special seminar
3. Specialization: Optics and spectroscopy
   - Spectroscopic technique
   - Geometrical optics
   - Spectrum analysis
   - Theoretical optics
   - Atomic spectroscopy
   - Luminescence
   - Theory of oscillations and waves
   - Electronics (radio techniques)
   - Molecular spectroscopy
   - Further topics in nuclear physics
   - Further topics in chemistry
4. Specialization: Molecular physics
   - Further topics in mechanics of continuous media
   - Fundamentals of theory of heat and mass transfer
   - Molecular-kinetic basis of theory of condensed matter, I
   - Special topics in thermodynamics and statistical physics
   - Gas dynamics
   - Independent student project
   - Special seminar
   - Molecular-kinetic basis of theory of condensed matter, II
   - Physics of burning processes
   - Method of (radioactive) indicator atoms
5. Specialization: Physics of low temperatures
   - Low temperature techniques
   - Special topics in low temperature physics (exp.)
   - Special topics in low temperature physics (theor.)
   - Special seminar
6. Specialization: Radio-physics
   - Acoustics
   - Theory of oscillations
   - Electronics (radio techniques)
   - Fundamentals of radio location (radar)
   - Theory of waves
   - Impulse systems
   - Special courses
   - Special seminar
7. Specialization: Geophysics
   - Geophysics
   - Hydrodynamics
   - Theory of turbulence
   - Hydrometeorological measurements
   - Thermodynamics of the sea
   - Dynamics of the sea
   - Hydrometry
   - Physics of ground waters
   - Physics of the atmosphere
   - Oceanography
   - Hydrochemistry
   - Dynamics of river flow
   - Physics of the upper atmosphere
   - Optics of the sea
   - Acoustics
   - Molecular physics of the sea
   - Seismology
   - Seismometry
   - Earth magnetism
   - Gravimetrics
   - Physical geology
   - Thermodynamics and dynamics of the atmosphere
   - Economics of the sea
   - Theory of prognoses
   - Synoptical meteorology
8. Specialization: Nuclear physics
   - Special courses and seminars

IIA. *Specialization Courses and Electives* (1959 curriculum):

1. Specialization: Theoretical physics
   - Special chapters in higher mathematics
   - Integral equations
   - Mathematical methods of theoretical physics
   - Theory of solid state
   - Special seminar
   - Special pedagogical courses and seminars
   - Nuclear theory and elementary particles
   - Statistical quantum physics
   - Quantum electrodynamics
   - Theory of gravitational field
   - Quantum chemistry
2. Specialization: Low temperature physics
   - Measurement techniques of low temperature
   - Special chapters in physics of low temperature
   - Properties of matter under low temperatures
   - Special pedagogical courses and seminar
3. Specialization: Molecular physics
   - Molecular and kinetic theory of condensed media
   - Gaseous dynamics
   - Structure of liquids and high polymers
   - Special seminar
   - Kinetics of chemical processes

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Physics of combustions and explosions
Molecule structure
Acoustic methods of analysis in molecular physics
Special pedagogical courses and seminars

4. Specialization: Optics and spectroscopy
Applied optics
Radiation theory
Theoretical optics
Molecular spectroscopy
Physical optics
Supplemental chapters in nuclear physics
X-ray spectroscopy
Electromagnetic theory of light
Luminescence
Atomic spectroscopy
Physics of gaseous discharge
Special seminars
Electronics
Special pedagogical courses and seminars

5. Specialization: X-ray and metallo-physics
Physics of X-rays
Solid state physics
Metals technology
Electron theory of metals
Electron microscopic analysis
Physical chemistry
X-ray analysis
X-ray analysis of metals
Property of metals
Physics of metals
Special seminar
Special pedagogical courses and seminars

6. Specialization: Magnetism
Alternating currents
Electric and magnetic measurements
Ferromagnetism
Physical and chemical analysis
Special seminar
Principles of magnetic analysis
Quantum theory of magnetism
Quantum theory of metals
Magnetic resonance
Special pedagogical courses and seminars

8. Specialization: Physics of semiconductors
Methods of measurement of electric-magnetic and optic properties
Crystallo-physics
Crystallo-chemistry
Physics of metals
Semiconductor electronics and equipment
Special seminar
Cathode physics
X-ray analysis
Physical and chemical analysis
Technology of semiconductors and special alloys
Selected chapters in the theory of solid state
Special pedagogical courses and seminars

9. Electron physics
Physics and technology of vacuum tubes
Electron emission
Special pedagogical courses and seminars
Electronic instruments
Electron optics
Special seminars

10. Specialization: Nuclear physics
Nuclear electronics
Physics of atomic nucleus
Elementary particles
Physics of radioactive isotopes
Physics of cosmic rays
Experimental methods of nuclear physics
Neutron physics
Special seminar
X-ray analysis
Special pedagogical courses and seminars

11. Specialization: Radiophysics
Theory of oscillation
Electronics of ultra-high frequencies
Principles of impulse technology
Radiation and propagation of radio waves
Special problems in information theory
Special seminar
Electrodynamics of ultra-high frequencies
Radio measurements
Nonlinear systems
Special problems in generator design
Semiconductor networks
Special pedagogical courses and seminars

12. Specialization: Electronics
Theory of oscillation
Electrodynamics of ultra-high frequencies
Electronics of ultra-high frequencies
Electronic and ionic instruments
Oscillation systems in electronics of ultra-high frequencies
Electronic networks
Design and construction of high-power electronic devices
Generation and radiation of electron beams
Technology of semiconductors and instruments
Design and construction of broad bent generators in ultra-high frequencies
Contemporary problems of electron optics
Physics of gaseous discharge
Electronic emission and physics of cathode ray
Special seminars
Special pedagogical courses and seminars

13. Specialization: Physics of high polymers
Selected chapters in organic chemistry
Methods of physical and chemical analysis
Chemical physics
Physics of high molecule compounds
Thermodynamics of irreversible processes
Theory of chain reactions
Statistical thermodynamics of high polymers
Kinetics and polymerization processes
Automatics and control
Special seminars
Special pedagogical courses and seminars

14. Specialization: Physics of atmosphere
Methods of atmospheric studies
Synoptic meteorology
Atmospheric optics
Physics of high altitude atmospheric layers
Special seminars
Dynamic meteorology
Actinology
Atmospheric electricity
Thermodynamics of atmosphere
Theory of turbulence
Special pedagogical courses and seminars

15. Specialization: Geophysics
Physics of the earth
Applied geophysics
Wave seismology
Seismology and seismometry
Thermodynamics of the sea
Acoustics of the sea
Special seminars
Geology
Earth magnetism
Radio metrology
Hydromechanics
Optics of the sea
Dynamics of the sea
Special pedagogical courses and seminars

III. *Time Budget in Weeks* (see text, Ch. IV).

IV. *Instruction Schedule* (see text, Ch. IV).

V. *Examination Schedule* (see text, Ch. IV).

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TABLE IV–B–5.—*Chemistry—University program: Comparison of 1955 and 1959 curricula (Specialty 2018)*

Subjects of instruction	1955 program (5 years)					1959 program (5 1/2 years)				
	Term	Lecture	Laboratory	Seminar or practice session	Total	Total	Lecture	Laboratory	Seminar or practice session	Term
1. (A) History of Communist Party	.....	.....	.....	.....	None	220	120	.....	100	1–4
(B) Foundations of Marxism-Leninism	1–4	144	.....	80	224	None	.....	.....	.....	.....
2. Political economy	5–8	100	.....	40	140	150	80	.....	70	5–6
3. Dialectical and historical materialism	7–9	80	.....	60	140	140	70	.....	70	7–9
4. Foreign language	1–5	.....	.....	270	270	270	.....	.....	270	1–4
5. Higher mathematics	1–5	258	.....	188	446	394	204	.....	190	1–4
6. Physics	2–5	204	136	66	406	336	168	168	.....	2–4
7. Technical drafting	6	.....	.....	32	32	54	.....	.....	54	5
8. Inorganic chemistry	1–2,7	172	308	.....	480	461	123	338	.....	1–2
9. Analytical chemistry	3–4,7	32	380	.....	412	434	66	368	.....	3–5
10. Organic chemistry	4–6	126	366	.....	492	404	132	272	.....	4–6
11. Physical chemistry	6–7	132	252	.....	384	396	140	204	52	5–7
12. Selected chapters of theoretical physics and molecular structure	6	64	.....	.....	64	132	132	.....	.....	5–6
13. Chemistry of crystals	7	36	18	.....	54	54	20	.....	34	5
14. Colloidal chemistry	7–8	46	70	.....	116	126	54	72	.....	7
15. Chemistry of polymers	.....	.....	.....	.....	None	48	48	.....	.....	6
16. Basic processes and equipment of chemical industry	.....	.....	.....	.....	None	54	36	.....	18	7
17. Workshop practice (class work)	1–2	.....	.....	86	86	36	.....	.....	36	1
18. Chemical technology	6–8	102	100	.....	202	212	126	86	.....	6–9
19. Specialization courses and laboratory	8–9	100	284	.....	384	484	206	278	.....	7–10
20. History of chemistry	9	36	.....	.....	36	None	.....	.....	.....	.....
21. X-ray methods of analysis	5	36	36	.....	72	None	.....	.....	.....	.....
22. Physical education	1–4	.....	.....	136	136	120	.....	.....	120	1–2
Grand total	.....	1,670	2,066	840	4,576	4,525	1,725	1,822	978	.....

Sources: 1955: *Source X*, loose-leaf program.
1959: *Source Y*, Folio 42.

SUPPLEMENT 1 TO TABLE IV–B–5.—*Additional Information on Curriculum*

I. *Optional Courses:*

1. Physical education
2. Selected chapters of higher mathematics
3. X-ray analysis
4. Foreign language
5. Chromotology
6. Chemical thermodynamics
7. Chemical kinetics
8. Kinetics of electrolysis
9. Theory of catalysis
10. Biochemistry
11. Theory of solutions
12. History of chemistry

II. *Specialization Courses and Electives (1955):*

1. Specialization: Inorganic chemistry
   1. Methods of analysis of inorganic compounds
   2. Inorganic synthesis
   3. Chemistry of rare earths
   4. Theory of complex compounds
   5. Physical chemical analysis
   6. Metallography
   7. New methods and processes of chemical technology
2. Specialization: Organic chemistry
   1. General theory of organic compounds
   2. Analysis of organic compounds
   3. Physical-chemical methods of analysis of organic compounds
   4. Organic synthesis
   5. Chemistry of elementary organic compounds
   6. Chemistry of albumin
   7. Chemistry of heterocyclic compounds
   8. Chemistry of petroleum
   9. Chemistry of synthetic and gaseous fuels
   10. Chemistry of hydrocarbon compounds and lubricants
   11. Organic catalysis
   12. New processes in chemical technology
   13. Chemistry and structural chemistry of biological compounds
3. Specialization: Physical chemistry
   1. Chemical thermodynamics
   2. Thermochemistry
   3. Molecular spectroscopy
   4. Catalysis and kinetics
   5. Adsorption
   6. Colloidal chemistry and dispersion analysis
   7. Chemical kinetics
   8. Theoretical electro-chemistry
   9. Physics and chemistry of high pressure processes
   10. Gaseous electro-chemistry
   11. Crystallo-chemistry
   12. Physics and chemistry of radioactive isotopes
4. Specialization: Analytical chemistry
   1. Optical, chemical, microchemical methods of analysis
   2. Analytical chemistry control of chemical production processes
   3. Chromotological analysis
   4. Luminiscent analysis
   5. Gas analysis
   6. Spectral analysis
5. Specialization: Radioactive elements
   1. Chemistry of radioactive elements
   2. Methods of work with radioactive elements
   3. Refinement and separation of radioactive elements

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4. Selected chapters in chemistry of radioactive elements
5. Marked atoms

IIA. *Specialization Courses and Electives* (1959):

Similar specialization and elective courses as in 1 through 5 above, with the addition of another specialization: Chemistry of high molecular compounds, as follows:
1. Chemistry and physics of high molecular compounds
2. Production and methods of analysis
3. Organic analysis of high polymers
4. Theoretical foundations of organic chemistry
5. Radiational chemistry

III. *Time Budget in Weeks:*

	1955	*1959*
1. Instruction	148	192
2. Examinations	30	31
3. Practice assignments	7	[a]8 (34)
4. Diploma project	20	17
5. Vacations	45	46
Total	260	294

IV. *Instruction Schedule:*

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
Weeks in term											
1955 (5 years)	18	16	18	16	18	16	18	10	18	20	..
1959 (5½ years)	18	16	18	16	18	16	18	[a]42		17	17
Hours per week in term											
1955	35	36	32	32	30	30	32	31	24	DP	..
1959	32	32	32	32	32	32	32	[b]12		[c]11	DP

DP—Diploma project.
[a] Terms 8 and 9 are combined.
[b], [c] Part-time instruction takes place while students participate in full-time practice assignments.

V. *Examination Schedule:*

	1955	*1959*
1. Graded examinations	27	29
2. Qualifying examinations	37	28
3. Graded course work	3	1

[a] 34 weeks of practice assignment during the 8th, 9th and 10th terms are combined with part-time study, while 8 weeks are taken without part-time study.

SUPPLEMENT 2 TO TABLE IV–B–5.—*Chemistry courses required of Moscow State University students as of 1945*

Courses of instruction	Total	Lectures	Laboratory practice	Year of course
Nonspecialized	1,839	493	1,346	.....
Inorganic	.....	136	300	1
Organic	.....	204	400	2–3
Physical	.....	102	442	3–4
Analytical	.....	51	204	2
Specialized	859	638	221	.....
Crystallography	.....	34	51	3
Chemical technology	.....	102	.....	3
Theoretical physics	.....	68	.....	3
Molecular structure	.....	68	.....	4
Colloid chemistry	.....	68	68	4
History of chemistry	.....	68	.....	5
Advanced inorganic	.....	68	68	4
Quantum mechanics	.....	68	.....	5
Spectrochemistry	.....	54	.....	5
Biochemistry	.....	40	.....	5
Glassblowing	.....	.....	34	5
Total	2,698	1,131	1,567	.....

Source: Ashby, *Scientist in Russia*, p. 92.
This is an abstract of chemistry courses from the curriculum of the Division of Chemistry of Moscow University. Chemistry courses represent roughly one-half of the curriculum of some 5,200 to 5,400 hours.
The other half of the curriculum consists of physics, higher mathematics, strength of materials, mechanics, drawing, descriptive geometry, foreign language, political instruction, military and physical training, etc.

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TABLE IV–B–6.–*Mechanics–University program: Comparison of 1955 and 1959 curricula (Specialty 2014)*

Subjects of instruction	1955 program (5 years)					1959 program (5 1/2 years)				
	Term	Lecture	Laboratory	Seminar or practice session	Total	Total	Lecture	Laboratory	Seminar or practice session	Term
1. (A) History of Communist Party	.....	.....	.....	.....	none	220	120	.....	100	1–4
(B) Principles of Marxism-Leninism	1–4	144	.....	80	224	none	.....	.....	.....	.....
2. Political economy	5–8	100	.....	40	140	150	80	.....	70	5–6
3. Dialectical and historical materialism	7–9	80	.....	60	140	140	70	.....	70	7–9
4. Foreign language	1–4	.....	.....	204	204	272	.....	.....	272	1–4
5. Drafting and descriptive geometry	.....	.....	.....	.....	none	102	.....	102	.....	1–2
6. Astronomy	1	70	.....	.....	70	54	54	.....	.....	3
7. Analytical geometry	1–2	102	.....	86	183	188	102	.....	86	1–2
8. Mathematical analysis	1–4	240	.....	220	460	476	272	.....	204	1–4
9. Higher algebra	1–2	68	.....	68	136	208	142	.....	66	1–3
10. Differential geometry and tensor analysis	3	54	.....	16	70	108	82	.....	26	3
11. Differential equations	3–4	68	.....	68	136	136	68	.....	68	3–4
12. Equations of mathematical physics	6–7	100	.....	36	136	136	100	.....	36	6–7
13. Theoretical mechanics	2–6	216	.....	118	334	304	188	.....	116	4–7
14. Theory of probabilities	9	42	.....	14	56	54	36	.....	18	5
15. Variational calculus	5	36	.....	.....	36	36	36	.....	.....	5
16. Functions of complex variable	5	72	.....	36	108	102	68	.....	34	5–6
17. Physics	3–7	170	104	36	310	300	120	120	60	4–6
18. Electrical and radio engineering	.....	.....	.....	.....	none	84	42	42	.....	7–8
19. Strength of materials	4	32	32	.....	64	104	68	.....	36	5–6
20. Theory of elasticity and plasticity	5–6	100	.....	.....	100	84	84	.....	.....	7–8
21. Methods of approximations	.....	.....	.....	.....	none	104	40	64	.....	6–8
22. Computers and mathematical programming	.....	.....	.....	.....	none	68	68	.....	32	5–6
23. Hydro-aerodynamics	4–6	134	.....	.....	134	152	152	.....	.....	6–8
24. Laboratory practice assignments	5–9	.....	436	.....	436	272	.....	272	.....	5–8
25. Specialty courses and electives	5–9	180	.....	176	356	490	290	.....	200	7–11
26. Physical education	1–4	.....	.....	136	136	136	.....	.....	136	1–4
27. Gaseous dynamics	7–8	60	.....	.....	60	none	.....	.....	.....	.....
28. Vibration theory	7	36	.....	.....	36	none	.....	.....	.....	.....
Grand total	.....	2,160	572	1,394	4,126	4,480	2,250	600	1,630	.....

Sources: 1955: *Source X*, loose-leaf program for Moscow State University. The same program is reproduced in *ASEE*, p. 902, with the note that it was offered at MSU as of 1958–59.

1959: *Source Y*, Folio 37.

SUPPLEMENT TO TABLE IV–B–6.–*Additional Information on Curriculum*

I. *Optional Courses:*

1. Foreign language
2. Physical education
3. History of mechanics
4. Mechanics of solid state
5. Automatic control devices

II. *Specialization Courses and Electives* (1955 curriculum):

1. Specialization: Theory of elasticity
   1. Plates and shells
   2. Statics and dynamics of disturbances
   3. Wave propagation in elastic media
   4. Plane problems in elasticity
   5. The contact problem in elasticity
   6. Variational methods in elasticity
   7. Optical methods of stress investigation
   8. Stability of elastic systems
   9. Vibrations of elastic systems
   10. Propagation of nonlinear waves
   11. Methods of measurement of mechanical waves
   12. Advanced strength of materials
   13. Theory of elasticity of anisotropic materials
   14. Theory of strength
2. Specialization: Aeromechanics and hydromechanics
   1. Thin wing theory
   2. Hydrodynamical methods in function theory
   3. Wing and propeller theory
   4. Advanced gas dynamics
   5. Spherical dynamics of the stability of flight vehicles
   6. Kinetic theory of gases
   7. Flight dynamics
   8. Turbulence theory
   9. Experimental aeromechanics
   10. Aeromechanics of bodies of variable mass
   11. Theory of reactive propulsion
   12. Transonic flow
   13. Applied gas dynamics
   14. Unsteady gas motion
   15. Oscillations of bodies in air streams
   16. Turbine theory
   17. Theory of cavitating motion
   18. Plane problems in hydromechanics
   19. Theory of flow of mixtures and suspensions
   20. Theory of acoustic waves
   21. Hydromechanical applications to meteorology
   22. Theory of motion of viscous fluids
   23. Hydraulics
   24. Jet theory
   25. Mixed problems
   26. Filtration of liquids and gases
   27. Theory of wave motion
3. Specialization: Applied mechanics
   1. Vibration theory
   2. Regulation theory
   3. Dynamics of machines

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4. Synthesis of mechanisms
5. Applied gyroscope theory
6. Gyroscopic stabilization
7. Electromechanics and electrical machines
8. Computing mechanisms
9. Operational and metric calculation in vibration theory
10. Measurement of mechanical quantities
11. Vibrations of shafts
12. Non-linear vibrations
13. Statistical methods in the theory of oscillations and regulations
14. Dynamics of guided flight
15. Theory of mechanisms
16. Model theory and similarity
17. Following systems

4. Specialization: Theoretical mechanics
1. Stability of motion
2. Integration of the dynamical equations
3. Periodic solutions of mechanics problems
4. Mechanics of bodies of variable mass
5. Motion of bodies about fixed points
6. Dynamics of nonholonomic systems
7. Principles of mechanics of threads
8. Methods of teaching mechanics
9. Relativistic mechanics
10. Geometrical theories of body motion
11. Integral invariants
12. History of mechanics in Russia and the U.S.S.R.
13. The philosophical basis of mechanics
14. History of hydro-aeromechanics
15. History of elasticity

5. Specialization: Wave propagation dynamics
1. Propagation of elasto-plastic waves
2. Theory of ultrasonic waves
3. Theory of surface waves in liquids
4. Theory of solid impact
5. Thermodynamics
6. Shock waves and detonations

6. Specialization: Department of the theory of plasticity
1. Plane problems in plasticity
2. Metal working
3. Physics of metals
4. Theory of plasticity I and II
5. Creep of metals
6. Visco plastic flow
7. Stability beyond the elastic limit

II. *Specialization Courses and Electives* (1959 curriculum): Lists 23 courses from among those mentioned for 1955 above, without putting them in specialization groups.

III. *Time Budget in Weeks*

	1955	*1959*
1. Instruction	146	177
2. Examinations	31	30
3. Practice assignments	8	[a]7 (34)
4. Diploma project and state examinations	20	17
5. Vacations	46	51
Total	251	282

[a] Total practice assignment is 41 weeks, of which 34 are in the 9th and 10th terms with full-time employment and part-time study being combined.

IV. *Instruction Schedule:*

	Weeks in term										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1955 (5 years)	18	16	18	16	18	16	18	12	14	20	..
1959 (5½ years)	18	16	18	16	18	16	18	16	18	16	17
	Hours per week in term										
1955	31	32	32	30	30	27	20	22	19	[a]2	..
1959	31	30	31	31	32	31	30	26	[b]10	[b]8	[a]5

V. *Examination Schedule:*

	1955	*1959*
1. Graded examinations	31	30
2. Qualifying examinations	39	40
3. Graded course work	3	2

[a] Instruction is taken while diploma project is being prepared.
[b] Part-time study while on practice assignment.

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TABLE IV–B–7.—*Humanities—Russian language and literature, university program: Comparison of 1955 and 1959 curricula (Specialty 2001)*

Subjects of instruction	1955 program (5 years)					1959 program (5 years)				
	Term	Lecture	Laboratory	Seminar or practice session	Total	Total	Lecture	Laboratory	Seminar or practice session	Term
1. (A) Foundations of Marxism-Leninism	5–8	144	.....	80	224	none	.....	.....	.....	.....
(B) History of Communist Party	.....	.....	.....	.....	none	220	140	.....	80	1–4
2. Political economy	1–4	112	.....	100	212	140	80	.....	60	5–8
3. Dialectical and historical materialism	3–5	80	.....	60	140	140	60	.....	80	6–8
4. History of philosophy	9	70	.....	.....	70	70	70	.....	.....	9
5. Logic	1	44	.....	26	70	70	44	.....	26	5
6. Foreign language	1–4	.....	.....	270	270	344	.....	344	.....	1–5
7. Latin	3–4	136	.....	.....	136	104	.....	104	.....	3–4
8. Psychology	5	20	16	.....	36	54	36	18	.....	5
9. Pedagogy and history of pedagogy	7	64	.....	.....	64	88	88	.....	.....	6–7
10. Methodology of teaching Russian language	7	24	.....	12	36	60	30	.....	30	7–8
11. Methodology of teaching Russian literature	7	24	.....	12	36	60	30	.....	30	7–8
12. Introductory linguistics	1	90	.....	12	102	68	42	26	.....	1–2
13. General linguistics	.....	.....	.....	.....	none	72	60	.....	12	9
14. Old Church Slavonic	2–3	100	.....	36	136	68	32	36	.....	3–4
15. Russian dialectology	3–5	124	.....	48	172	48	30	18	.....	4
16. History of Russian language						192	120	72	.....	5–7
17. Contemporary Russian language	1–7	222	.....	86	308	424	144	200	80	1–6
18. Applied stylistics of Russian language	.....	.....	.....	.....	none	56	12	44	.....	7
19. Introductory literary analysis	.....	.....	.....	.....	none	72	40	32	.....	3
20. Theory of literature and foundations of Marxist-Leninist aesthetics	2	44	.....	20	64	72	60	.....	12	9
21. Russian folklore	1	72	.....	.....	72	54	36	.....	18	1
22. History of Russian literature	2–9	372	.....	16	388	430	328	12	80	2–9
23. West European, ancient and Oriental literature	2–6	408	.....	.....	408	310	310	.....	.....	1–7
24. Literature of the peoples of the U.S.S.R.	8–9	100	.....	.....	100	92	92	.....	.....	6–8
25. Special course electives	4–9	422	.....	168	590	464	230	234	.....	3–9
26. History of Russian literary language	6	72	.....	.....	72	none	.....	.....	.....	.....
27. Comparative grammar of East Slavic languages	8	56	.....	.....	56	none	.....	.....	.....	.....
28. Pedagogical practice	9	.....	.....	60	60	none	.....	.....	.....	.....
29. Physical education	1–4	.....	.....	136	136	136	.....	.....	136	3–4
Grand total	.....	2,664	16	1,288	3,958	3,908	2,114	1,140	654	.....

Sources: 1955: *Source X*, loose-leaf program.
1959: *Source Y*, Folio 1.

SUPPLEMENT TO TABLE IV–B–7.—*Additional Information on Curriculum*

I. *Optional Courses* (1959):

1. Foreign language
2. History of the U.S.S.R.
3. School hygiene
4. Extracurricular school activities
5. General history
6. Lexicology
7. History of Russian theater
8. History of the arts
9. Greek
10. Art reading
11. Physical education
12. Sanskrit

1955: simply states "various courses."

II. *Specialization Courses and Electives:* unknown.

III. *Time Budget in Weeks*

	1955	1959
1. Instruction	145	[a]153
2. Examinations	31	28
3. Practice assignments	9	[b]16
4. Diploma project and state examinations	20	20
5. Vacations	46	34
Total	251	251

[a] Among these, 34 weeks are part-time study while fully employed during the 1st and 2d terms, and 20 weeks during the 8th term.

IV. *Instruction Schedule:*

Hours per week in term

	1	2	3	4	5	6	7	8	9	10
1955 (5 years)	30	28	31	32	27	30	20	20	23	DP
1959 (5 years)	16	16	32	30	32	30	36	16	24	DP

Weeks in term

1955	18	16	18	16	18	16	18	10	15	20
1959	18	16	18	16	18	16	14	16	18	20

DP—Diploma project.

V. *Examination Schedule:*

	1955	1959
1. Graded examinations	32	30
2. Qualifying examinations	27	32
3. Graded course work	4	3

[b] During the 8th term there are an additional 16 weeks of practice assignment (full-time employment, part-time study).

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TABLE IV–B–8.—*Economics—Political economy in universities: Comparison of 1955 and 1959 curricula (Specialty 2010)* [a]

Subjects of instruction	1955 program (5 years)					1959 program (5 years)				
	Term	Lecture	Laboratory	Seminar or practice session	Total	Total	Lecture	Laboratory	Seminar or practice session	Term
1. (A) History of Communist Party	.....	.....	.....	.....	none	224	120	.....	104	5–7
(B) Foundations of Marxism-Leninism	6–9	144	.....	80	224	none	.....	.....	.....	.....
2. Political economy	1–6	220	.....	180	400	400	220	.....	180	1–5
3. Dialectical and historical materialism	1–3	80	.....	60	140	140	70	.....	70	2–4
4. Economic geography (development of resources)	1–2	136	.....	.....	136	70	70	.....	.....	1
5. History of economic doctrines	5–7	140	.....	.....	140	140	100	.....	40	4–7
6. History of national economics	3–4	180	.....	.....	180	120	120	.....	.....	1–2
7. Technology of various industries	2–3	80	.....	20	100	90	70	.....	20	1
8. Foundations of agriculture and animal breeding	1–2	66	.....	20	86	70	50	.....	20	3
9. Economics of socialist industry	5–6	90	.....	30	120	90	60	.....	30	5–6
10. Economics of socialist agriculture	5–6	75	.....	25	100	70	40	.....	30	5–6
11. Economics of labor	.....	.....	.....	.....	none	36	18	.....	18	7
12. Planning of national economy	7–8	100	.....	20	120	120	80	.....	40	6–8
13. Theoretical statistics	3–6	140	.....	130	270	90	36	.....	54	3
14. Economic statistics						200	84	.....	116	3–5
15. Accounting and cost analysis	2–4	100	.....	86	186	170	90	.....	80	2
16. Accounting machines	1	.....	70	.....	70	70	.....	70	.....	2–3
17. Higher mathematics	1–2	80	.....	90	170	200	100	.....	100	1–2
18. Mathematics of economic calculations and planning	.....	.....	.....	.....	none	70	30	.....	40	8–9
19. Foreign language	1–5	.....	.....	360	360	470	.....	.....	470	1–6
20. Methodology of teaching political economy	9	36	.....	144	180	180	.....	.....	180	8–9
21. Special seminar on Marx: "Capital"	4–5	.....	.....	120	120	136	.....	.....	136	4–5
22. Special seminar on imperialism	7	.....	.....	72	72	72	.....	.....	72	6
23. Special seminar on socialism	8–9	.....	.....	120	120	140	.....	.....	140	7–8
24. History of philosophy	4–5	72	.....	.....	72	none	.....	.....	.....	.....
25. Economics of Soviet trade	5	36	.....	.....	36	36	36	.....	.....	5
26. Finance and credit in U.S.S.R.	7	96	.....	.....	96	80	60	.....	20	5
27. Civil, labor and agricultural law	8	90	.....	.....	90	50	50	.....	.....	9
28. Organization and planning of agricultural enterprises	8	40	.....	20	60	36	24	.....	12	7
29. Organization and planning of industrial enterprises	9	40	.....	30	70	50	30	.....	20	9
30. Specialization electives	7–9	142	.....	140	282	170	170	.....	.....	6–9
31. Physical education	1–4	.....	.....	128	128	136	.....	.....	136	1–4
Grand total	.....	2,183	70	1,875	4,128	3,924	1,728	70	2,126	.....

[a] The 1959 curriculum is for students with 2 years of employment experience. There is another version of this curriculum based on 6 years of study with 2,306 instruction hours. In the latter version the entire program is taken on a part-time basis with a maximum load of 14 instruction hours per week.

Sources: 1955: *Source X*, loose-leaf program. The author is indebted to Professor R. N. Anthony of the Harvard Business School for providing him with original copies of this study plan.
1959: *Source Y*, Folio 32.

SUPPLEMENT TO TABLE IV–B–8.—*Additional Information on Curriculum*

I. *Optional Courses* (1959 curriculum):

1. Economics of one foreign country
2. Economics of international trade
3. Finance and credit in one foreign country
4. Second foreign language
5. Specialty electives

II. *Specialization Courses and Electives:* unknown.

III. *Time Budget in Weeks:*

	1955	1959
1. Instruction	142	[a]128 (23)
2. Examinations	31	30
3. Practice assignments	14	36
4. Diploma project and state examinations	20	18
5. Vacations	44	41
Total	251	253

[a] Additional 23 weeks of instruction during the 9th term are on a part-time study—full-time employment basis.

IV. *Instruction Schedule:*

	Weeks in term									
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1955 (5 years)	18	16	18	12	18	12	18	12	18	20
1959 (5 years)	18	16	18	16	18	12	18	12	23	16
	Hours per week in term									
1955	32	32	32	32	26	25	26	28	30	DP
1959	32	32	28	28	28	29	26	26	[a]13	DP

DP—Diploma project and state examinations.
[a] Part-time study—full-time employment.

V. *Examination Schedule:*

	1955	1959
1. Graded examinations	31	33
2. Qualifying examinations	31	34
3. Graded course work	8	8

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TABLE IV–B–9.—*Electrical engineering—Electronic equipment, institute program: Comparison of 1955 curricula—5-year general and 5½-year individual (Specialty 0611)*

Subject	Total, hrs.		Lecture		Laboratory		Seminar and practice session		Hours per week per term																					
									1		2		3		4		5		6		7		8		9		10		11	
	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
1. Principles of Marxism and Leninism	256	250	156	160	.....	.....	100	90	4	5	3	3	4	3	4	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	↑	.....	.....	↑
2. Political economy	140	140	100	100	.....	.....	40	40	.....	.....	.....	.....	.....	.....	.....	.....	3	3	2	3	2	3	3	1	.....	.....		.....	.....	
3. Foreign language	256	252	.....	.....	.....	.....	256	252	2	2	2	2	2	2	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....	
4. Higher mathematics	408	410	220	222	16	.....	172	188	8	8	8	7	4	5	4	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....	
5. Physics	306	428	186	206	86	120	34	102	4	.....	7	7	5	8	2	4	.....	6	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....	
6. Chemistry	120	108	70	54	50	54	.....	.....	4	6	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....	
7. Descriptive geometry and drafting	210	208	36	36	.....	.....	174	172	7	6	3	2	2	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....	
8. Theoretical mechanics	120	170	86	102	.....	.....	34	68	.....	.....	3	5	4	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....	
9. Strength of materials	256	80	156	48	32	.....	68	32	.....	.....	.....	.....	4	.....	7	5	4	.....	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....	
10. Metal working and shop	170	204	52	68	118	118	.....	18	5	3	5	6	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....	
11. Electrical circuits	290	254	172	118	84	68	34	68	.....	.....	.....	.....	5	2	8	8	4	5	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....	
12. Electrotechnical materials	72	48	54	36	18	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	4	.....	.....	.....	.....	.....		.....	.....	
13. Electrical measurements	72	114	36	54	36	36	.....	24	.....	.....	.....	.....	.....	.....	.....	.....	4	5	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....	
14. Electrical machines	108	132	72	84	36	48	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	2	.....	8	.....	.....	.....	.....	.....	.....		.....	.....	
15. Electromagnetic fields	.....	72	.....	36	.....	18	.....	18	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....	
16. Electro vacuum technology	132	90	92	54	40	36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	5	6	2	.....	.....	.....	.....	.....	.....		.....	.....	
17. Radio technology	150	84	102	72	30	12	18	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	6	7	.....	.....	.....	.....	.....	.....		.....	.....	
18. Electrical effects in gases	.....	84	.....	60	.....	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	.....	.....	.....	.....	.....	.....		.....	.....	
19. Illumination	.....	64	.....	48	.....	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....		.....	.....	
20. Electron tubes	156	200	102	120	36	56	18	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	7	8	.....	6	.....	.....		.....	.....	
21. Ionic devices	80	48	50	32	30	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8	.....	.....	3	.....	.....	.....	.....		.....	.....	
22. Technology of electro vacuum devices	186	172	120	116	46	56	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	2	.....	3	5	4	5	.....	2		.....	.....	
23. UHF devices	196	160	128	120	40	40	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	.....	6	4	2	4		4	.....	
24. Photo electric devices	.....	64	.....	48	.....	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....		.....	.....	
25. Semi conductors	42	48	28	48	14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	3	.....		.....	.....	
26. Testing and use of electronic devices	104	212	62	148	42	40	.....	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	5	6	5		6	.....	
27. X-ray devices	102	112	78	88	24	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	.....	3	4		4	.....	
28. Generation and measure of radiation	84	.....	56	.....	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	3	.....	.....	.....	.....	.....		.....	.....	
29. Economics of electronic industry	100	96	86	68	.....	.....	14	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	5	3		4	.....	
30. Safety and fire prevention	42	36	32	36	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	3	.....		.....	.....	
31. History of technology	.....	48	.....	36	.....	.....	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....		.....	.....	
32. Pre-diploma electives	70	.....	70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....		.....	.....	
33. Typical calculations	.....	244	.....	.....	.....	.....	.....	244	.....	2	.....	2	.....	2	.....	2	.....	4	.....	3	.....	.....	.....	.....	.....	.....		.....	.....	
34. Research	.....	336	.....	.....	.....	336	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	4	.....	8		8	.....	
35. Physical education	136	136	.....	.....	.....	.....	136	136	2	2	2	2	2	2	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....	
Total	4,364	5,104	2,402	2,418	816	1,146	1,146	1,540	36	34	36	36	32	34	29	34	34	34	30	34	25	34	24	32	27	26	.....	26	.....	.....

Diploma Project

a—General 5-year curriculum.
b—Individual curriculum offered at Moscow Power Institute.

Source: *Source Z*, pp. 167–70, as reproduced in *ASEE*, pp. 890–91.

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SUPPLEMENT TO TABLE IV–B–9.—*Additional Information on Curriculum*

I. *Optional Courses* (a—5-year general curriculum):

1. Physical education
2. Special chapters in higher mathematics
3. Special chapters in physics

(b—5½-year individual curriculum):

1. Foreign language
2. Physical education
3. Dialectical and historical materialism
4. Physics of solid state
5. Cathode ray theory
6. Fundamentals of automatics and telemechanics
7. Theory of nonlinear networks
8. Technical drafting

II. *Specialization Courses and Electives:* unknown.

III. *Time Budget in Weeks:*

	Curriculum a	*Curriculum b*
1. Instruction	138	155
2. Examinations	29	34
3. Practice assignments	22	20
4. Diploma project	16	24
5. Vacations	46	53
Total	251	286

IV. *Instruction Schedule:*

	Weeks in term										
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
Curriculum a (5 years)	18	16	18	16	18	10	18	10	14	16	..
Curriculum b (5½ years)	18	16	18	16	18	12	16	12	16	12	24
	Hours per week in term										
Curriculum a	36	36	32	29	34	30	25	24	27	DP	..
Curriculum b	34	36	34	34	34	34	34	32	26	26	DP

DP—Diploma project.

V. *Examination Schedule:*

	Curriculum a	*Curriculum b*
1. Graded examinations	40	41
2. Qualifying examinations	53	60
3. Graded course work	5	5

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TABLE IV–B–10.—*Mechanical engineering—Machine building (turbines)—institute curriculum: Comparison of 1955 general 5-year and individual 5½-year curriculum (Specialty 0521)*

Subject	Total, hrs.		Lecture		Laboratory		Seminar and practice session		Hours per week per term																					
									1		2		3		4		5		6		7		8		9		10		11	
	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
1. Principles of Marxism and Leninism	256	250	156	160	.....	.....	100	90	4	5	3	3	4	3	4	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2. Political economy	140	140	100	100	.....	.....	40	40	.....	.....	.....	.....	.....	.....	.....	.....	3	3	2	3	2	3	3	3	.....	.....	.....	.....	.....	.....
3. Foreign language	256	252	.....	.....	.....	.....	256	252	2	2	2	2	2	2	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4. Higher mathematics	408	408	220	220	16	.....	172	188	8	8	8	7	4	5	4	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5. Physics	274	274	170	170	70	70	34	34	4	.....	7	6	5	7	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6. Chemistry	104	104	36	36	68	68	.....	.....	4	4	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7. Descriptive geometry and drafting	276	278	54	54	.....	.....	222	222	8	9	4	4	2	2	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8. Theoretical mechanics	200	215	134	115	.....	.....	66	100	.....	.....	4	3	4	6	4	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
9. Strength of materials	226	232	140	133	34	33	52	66	.....	.....	.....	.....	4	4	4	5	5	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
10. Mechanisms and machines	100	197	64	80	.....	20	36	97	.....	.....	.....	.....	.....	.....	4	4	2	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
11. Metal working and shops	348	386	144	182	204	204	.....	.....	4	6	4	7	5	2	3	.....	3	4	2	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
12. Detail design	174	215	110	85	.....	15	64	115	.....	.....	.....	.....	.....	.....	.....	.....	6	4	3	8	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
13. Electrical principles	180	162	96	100	56	32	28	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	.....	5	6	.....	6	.....	.....	.....	.....	.....	.....
14. Interchangeability and tolerances	.....	34	.....	24	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
15. Thermodynamics and heat transfer	222	233	148	199	46	14	28	20	.....	.....	.....	.....	.....	.....	.....	.....	9	3	6	4	.....	8	.....	.....	.....	.....	.....	.....	.....	.....
16. Hydraulics	108	102	90	68	18	15	.....	19	.....	.....	.....	.....	.....	.....	.....	.....	6	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
17. Steam and gas turbines	276	323	170	230	50	52	56	41	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8	.....	4	.....	4	13	6	11	.....	.....	.....	.....
18. Lifting and transporting machines	.....	116	.....	32	.....	.....	.....	84	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	8	.....	.....	.....	.....	.....	.....	.....	.....
19. Gas dynamics	.....	134	.....	90	.....	16	.....	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	5	.....	.....	.....	.....	.....	.....	.....	.....
20. Metallurgy	.....	135	.....	90	.....	45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	.....	.....	.....	.....	.....	3	.....	.....	.....	.....
21. Technology of turbine construction	152	70	132	60	.....	10	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	5	8	.....	.....	.....	.....	.....	.....	.....
22. Electric power stations	.....	52	.....	52	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....
23. **Thermal measurements**	72	.....	36	.....	36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
24. **Compressors**	56	78	42	65	14	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	4	.....	.....	.....	.....	.....
25. Automatic control	56	65	42	52	14	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	5	.....	.....
26. Fuels and boilers	132	.....	112	.....	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	6	.....	.....	.....	.....	.....	.....	.....
27. Combustion chambers*	56	70	56	14	.....	.....	.....	14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	5	.....	.....	.....	.....
28. Instrument maintenance aircraft gas turbine*	.....	56	.....	48	.....	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....
29. Heat exchangers*	.....	52	.....	42	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....
30. Aircraft gas turbines*	.....	65	.....	52	.....	.....	.....	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	.....
31. Economics and administration of industry	100	86	86	86	.....	.....	14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	5	4	.....	3	.....	.....
32. Safety engineering and fire prevention	42	42	42	32	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	3	.....	.....	.....	.....
33. History of mechanics	.....	42	.....	42	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....
34. Physical education	136	136	.....	.....	.....	.....	136	136	2	2	2	2	2	2	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	4,350	4,960	2,380	2,713	646	658	1,324	1,589	36	36	36	36	32	33	29	34	34	34	30	31	25	35	24	28	26	27	.....	27	.....	.....

Diploma Project

a—General 5-year curriculum.
b—Individual curriculum offered at Moscow's Bauman Higher Technical Institute.
*—Specialization courses in aircraft engine option; see Supplement to Table IV–B–10.

Sources: *Source Z*, pp. 119–20; *Source X*, loose-leaf curriculum, as reproduced in *ASEE*, pp. 892–95.

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SUPPLEMENT TO TABLE IV–B–10.—*Additional Information on Curriculum*

I. *Optional Courses* (a—5-year general curriculum):

1. Physical education
2. Engineering drawing
3. Automobiles
4. Thermal devices and measurements
5. Gas and steam turbines
6. Turbine assembly
7. Maintenance and overhaul of turbines
8. Plant organization
9. Materials
10. Machine design
11. Foreign language

(b—5½-year individual curriculum):

1. Physical education
2. Hydraulic machines
3. Special topics in mathematics
4. Special topics in metallurgy
5. Internal combustion engines
6. History of technology
7. Vibrations (theory and measurements)
8. Foreign language

II. *Specialization Courses and Electives* (Curriculum a—unknown):

Curriculum b—In the *b* version of the curriculum specialization courses for aircraft engines have been incorporated into the curriculum and are indicated on Table IV–B–10 by an asterisk. Two other specialization courses—steam turbines and gas turbines—are also available.

III. *Time Budget in Weeks:*

	Curriculum a	*Curriculum b*
1. Instruction	138	154
2. Examinations	29	37
3. Practice assignments	22	24
4. Diploma project	16	21
5. Vacations	46	50
Total	251	286

IV. *Instruction Schedule:*

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
	Weeks in term										
Curriculum a (5 years)	18	16	18	16	18	10	18	10	14	16	..
Curriculum b (5½ years)	18	16	17	16	17	16	14	13	14	13	21
	Hours per week in term										
Curriculum a	36	36	32	29	34	30	25	24	26	DP	..
Curriculum b	36	36	33	34	34	31	35	28	27	27	DP

DP—Diploma project.

V. *Examination Schedule:*

	Curriculum a	*Curriculum b*
1. Graded examinations	38	43
2. Qualifying examinations	52	61
3. Graded course work	5	7

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TABLE IV–B–11.—*Mechanical engineering—Design and technology of machine tools: Institute curriculum, 1946*[a]

Subjects	Hours	Distribution in percent	Year of study
I. Political	377	7.6	.....
1. Principles of Marxism-Leninism	248	.....	1–2
2. Political economy	129	.....	3–4
II. General and scientific	1,456	28.8	.....
3. Foreign language	266	.....	1–4
4. Higher mathematics	340	.....	1–2
5. Physics	200	.....	1–2
6. Chemistry	138	.....	1
7. Descriptive geometry	92	.....	1
8. Drawing and graphics	216	.....	1–2
9. Theoretical mechanics	204	.....	1–2
III. General engineering	1,407	27.8	.....
10. Physical metallurgy	107	.....	2–3
11. Strength of materials	170	.....	1–2
12. Theory of machines and mechanisms	124	.....	2–3
13. Machine components	201	.....	2–3
14. Metallography	105	.....	3
15. Nomography	30	.....	3
16. Electrical engineering	112	.....	3
17. Fluid mechanics	54	.....	4
18. Tolerances and measurements	72	.....	3
19. Thermodynamics and heat-power engineering	91	.....	4
20. Study-practice	341	.....	1–3
IV. Specialized engineering	1,286	25.4	.....
21. Lifting machines	76	.....	3–4
22. Machine tools (general)	80	.....	3
23. Kinematics of machine tools	36	.....	4
24. Design and calculation of machine tools	116	.....	4
25. Technology of metal cutting	80	.....	3
26. Cutting tools	100	.....	4
27. Technology of machine building	230	.....	4–5
28. Welding	64	.....	4
29. Machine foundings	48	.....	4
30. Drives	16	.....	4
31. Cold stamping	60	.....	5
32. Structures and their design	40	.....	5
33. Machine-shop layout	60	.....	5
34. Electric equipment	50	.....	5
35. Automatic machine tools	40	.....	5
36. Heat treatment (tempering)	30	.....	5
37. Organization of production	78	.....	4–5
38. Cost accounting and norms	32	.....	4
39. Fire prevention and safety	50	.....	5
V. Other	528	10.4	.....
40. Physical training	124	.....	1–2
41. Military training	404	.....	1–3
Total	5,054	100.0	.....
of which—lectures.	2,390	47.2	.....
laboratory, practice	2,664	52.8	.....

[a] It is assumed that in the 1950's this curriculum became Specialty 0501. See Table IV–B–11A.

SUPPLEMENT TO TABLE IV–B–11.—*Reconstruction of M.I.T. curriculum in mechanical engineering, with specialty in materials technology and metals processing, 1952*

Subjects	Hours	Distribution in percent	Term of study
I. Humanities and social sciences (not differentiated)	360	12.4	1–8
II. General scientific	1,125	38.9	.....
General inorganic chemistry	210	.....	1–2
Physics	330	.....	1–4
Calculus and differential equations	180	.....	1–4
Descriptive geometry	90	.....	2
Engineering and machine drawing	180	.....	1,3
Theoretical mechanics:			
Statics	45	.....	3
Dynamics	90	.....	4,6
III. General engineering	630	21.8	.....
Technical mechanics:			
Strength of materials	90	.....	5,7
Testing materials laboratory	60	.....	6
Machine design	135	.....	5,6
Fluid mechanics	75	.....	5,6
Fundamentals of heat power engineering	120	.....	5,6
Fundamentals of electrical engineering	60	.....	6
Engineering metals	90	.....	4
IV. Specialized engineering	510	17.6	.....
Machine tool laboratory and practice	120	.....	3,4
Engineering laboratory	120	.....	7,8
Metal processing	60	.....	7
Mechanical behavior of metals	30	.....	7
Metal cutting principles	45	.....	7
Mechanical engineering problems	45	.....	8
2 elective half courses	90	.....	7,8
V. Other	270	9.3	.....
Athletics	60	.....	1,2
Military science	180	.....	1–4
Quiz periods	30	.....	1,2
Total	2,895	100.0	.....

NOTE.—Reconstruction is made on the basis of instruction offered during the academic year, which assumedly has a total duration of 30 weeks (15 weeks per term). Losses of instruction time due to holidays coming during the week time are not accounted for.
Source: *MIT Bulletin*, catalog issue for 1952.

Sources and notes: This curriculum was obtained from *VVSh*, No. 10, 1946, p. 29, and refers to the academic year 1946–47. There probably have been some minor changes since then. This curriculum refers to a 5-year program. The last half of the 5th year is devoted entirely to the diploma project, the time for which is not included in the curriculum. On the average there are about 40 instruction hours per week, of which lectures occupy an average of 19 instruction hours. The total number of examinations in these 41 subjects was 55; the number of qualifying, in addition to graded examinations, was 46.

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TABLE IV–B–11A.—*Mechanical engineering—Design and technology of machine tools—Institute curriculum, 1955 (Specialty 0501)*

Subjects of instruction	Hours total	Lecture	Laboratory	Seminar and practice session	Course projects	Hours per week per term									
						1	2	3	4	5	6	7	8	9	10
1. Foundations of Marxism-Leninism	250	160	.....	90	.....	4	3	4	4	....	....	....	....	....	DP
2. Political economy	140	100	.....	40	.....	....	....	....	....	3	2	2	3	....	DP
3. Foreign language	256	.....	.....	256	.....	2	2	2	2	....	....	....	....	....	DP
4. Higher mathematics	360	180	16	164	.....	8	7	4	2	....	....	....	....	....	DP
5. Descriptive geometry	90	54	.....	36	.....	5	....	....	....	....	....	....	....	....	DP
6. Drafting	188	.....	.....	188	.....	3	3	3	2	....	....	....	....	....	DP
7. General chemistry	120	68	52	.....	.....	4	3	....	....	....	....	....	....	....	DP
8. Physics	232	120	96	16	.....	....	6	4	4	....	....	....	....	....	DP
9. Theoretical mechanics	182	100	.....	82	.....	....	4	3	4	....	....	....	....	....	DP
10. Strength of materials	204	120	34	50	.....	....	....	6	6	....	....	....	....	....	DP
11. Theory of machines and mechanisms	174	96	24	.....	54	....	....	....	3	7	....	....	....	....	DP
12. Machine components	172	90	.....	18	64	....	....	....	....	6	4	....	....	....	DP
13. Lifting and transportation machines and devices	74	32	.....	.....	42	....	....	....	....	....	2	3	....	....	DP
14. Technology of metals	176	168	8	.....	.....	2	2	2	....	4	....	....	....	....	DP
15. Workshop	172	.....	172	.....	.....	6	4	....	....	....	....	....	....	....	DP
16. Metallography and thermal processes	102	60	42	.....	.....	....	....	....	3	3	....	....	....	....	DP
17. Interchangeability and technical measurements	72	40	30	.....	.....	....	....	....	....	4	....	....	....	....	DP
18. Hydraulics and hydraulic machines	72	48	24	.....	.....	....	....	....	....	4	....	....	....	....	DP
19. General power engineering	106	76	30	.....	.....	....	....	....	....	....	4	3	....	....	DP
20. General electrical engineering	134	90	44	.....	.....	....	....	....	....	....	4	5	....	....	DP
21. Metal cutting	80	55	25	.....	.....	....	....	....	....	....	5	....	....	....	DP
22. Metal cutting machine tools	286	192	46	.....	48	....	....	....	....	....	9	5	6	....	DP
23. Electrical equipment of machine tools	48	36	12	.....	.....	....	....	....	....	....	....	....	4	....	DP
24. Design and production of metal cutting	144	120	24	.....	.....	....	....	....	....	....	....	6	....	6	DP
25. Technology of machine building	188	164	24	.....	.....	....	....	....	....	....	....	5	4	7	DP
26. Design of control equipment	48	48	.....	.....	.....	....	....	....	....	....	....	....	4	....	DP
27. Automatization of technological processes	50	40	10	.....	.....	....	....	....	....	....	....	....	....	5	DP
28. Design of machine shop and construction	70	70	.....	.....	.....	....	....	....	....	....	....	....	....	7	DP
29. Technology of hot processes	48	48	.....	.....	.....	....	....	....	....	....	....	....	4	....	DP
30. Economics of industry and organization and planning of production	98	76	.....	22	.....	....	....	....	....	....	....	....	4	5	DP
31. Safety and fire prevention	36	26	10	.....	.....	....	....	....	....	....	....	....	3	....	DP
32. Physical education	136	.....	.....	136	.....	2	2	2	2	....	....	....	....	....	DP
Total	4,508	2,479	723	1,098	208	36	36	30	32	31	30	29	32	30	DP
Weeks per term	.....	.....	.....	.....	.....	18	16	18	16	18	16	14	12	10	17

DP—Diploma project.

Source: *Source Z*, pp. 79–80.

SUPPLEMENT TO TABLE IV–B–11A.—*Additional Information on Curriculum*

I. *Optional Courses:*
1. Physical education
2. Special chapters in mathematics
3. Special chapters in equipment design
4. Assembly and testing of machine tools
5. Supplemental chapters in design of machine tools
6. Design of automatic machine tools and automatic lines

II. *Specialization Courses and Electives:* None.

III. *Time Budget in Weeks:*
1. Instruction 138
2. Examination sessions 30
3. Practice assignments 21
4. Diploma project 17
5. Vacations 45
Total 251

IV. *Instruction Schedule:* see table IV–B–11A.

V. *Examination Schedule:*
1. Graded examinations 41
2. Qualifying examinations 49
3. Graded course projects 1

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TABLE IV–B–12.—*Chemical engineering—Technology of silicates: Institute curriculum, 1938*[a]

Subjects of instruction	Total		Of which—		Number of instruction hours per term									
	Hours	Distribution in percent	Lectures	Laboratory and practice	1	2	3	4	5	6	7	8	9	10
I. Political	384	8.1												
1. Political economy	160		120	40	60	60	40							
2. Dialectical and historical materialism	134		96	38					54	80				
3. Leninism	90		90								60	30		
II. General and scientific	1,490	31.4												
4. Foreign language	236			236	40	40	40	40	36	40				
5. Descriptive geometry and graphics	200		40	160	140	60								
6. Higher mathematics	300		160	140	120	120	60							
7. Physics	220		120	100	80	100	40							
8. Inorganic chemistry	220		120	100	120	100								
9. Organic chemistry	194		100	94			80	60	54					
10. Theoretical mechanics	120		80	40		80	40							
III. Prespecialization engineering	1,506	31.8												DP
11. Analytical chemistry	360		20	340			180	180						DP
12. Physical chemistry	210		92	118					90	120				DP
13. Colloidal chemistry	80		40	40							80			DP
14. Technical mechanics	228		114	114						120	108			DP
15. Thermodynamics and thermokinetics	100		60	40				100						DP
16. Heat-power engineering	148		72	76					108	140				DP
17. Electrical engineering	120		60	60							120			DP
18. General chemical technology	160		120	40						100	60			DP
19. Chemical processes, equipment and materials	100		60	40						100				DP
IV. Narrow specialization	1,060	22.4												DP
20. Specialized mineralogy and related subjects	130		70	60					90	40				DP
21. Physical chemistry of silicates	80		60	20						80				DP
22. Safety and fire prevention	50		50									50		DP
23. Processes and equipment of silicate industry	120		70	50							120			DP
24. Plant layout and design	40		40								40			DP
25. General silicate technology	190		80	110							120	70		DP
26. Ovens and driers of silicate industry	140		80	60								80	60	DP
27. Special silicate technology	240		100	140								40	200	DP
28. Organization of production	70		70									30	40	DP
V. Military-physical training	300	6.3												
29. Military training	140			140			80	60						
30. Physical training	160			160	40	40	40	40						
Total	4,740	100.0	2,164	2,576	600	600	600	600	540	600	600	300	300	DP
Distribution	(100.0)		(45.7)	(54.3)										

[a] It is assumed that this became Specialty 1806 in the 1950's. See Table IV–B–12A.

SOURCES AND NOTES TO TABLE IV–B–12

This curriculum was abstracted from *Tsement*, No. 11, 1938, p. 6. Comments are as follows:

DP—Indicates that the entire time during the 10th semester in the second half of the fifth year of study is devoted to diploma projects. Time spent thereon is not counted in the curriculum.

14. Technical mechanics.—Includes study of strength of materials, applied mechanics and theory of machines and mechanisms. In other curricula these subjects are given as separate courses.

19. Chemical processes.—Includes also chemical resistivity of materials. This course is on general chemical technology.

20. Specialized mineralogy.—Includes microstructures, geology and petrography of silicate materials.

Although this curriculum refers to 1938, it does not appear that it has been changed very drastically since then. There has been an increase of twelve weeks in the length of study in this type of engineering institutes since the war. It is believed that only a couple of specialized subjects of instruction have been added, while on the whole the original curriculum has remained unaltered.

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SUPPLEMENT TO TABLE IV–B–12.—*Reconstruction of M.I.T. curriculum in chemical engineering, with specialty in industrial chemistry*

Subjects	Hours	Distribution in percent	Term of study
I. Humanities and social sciences (not differentiated)	360	11.5	1–8
II. General scientific	945	30.1	.....
General inorganic chemistry	210	.....	1–2
Physics	330	.....	1–4
Calculus and differential equations	180	.....	1–4
Descriptive geometry	90	.....	2
Engineering drawing	90	.....	1
Theoretical mechanics Statics and dynamics	45	.....	3
III. General engineering (and non-specialized chemistry)	795	25.4	.....
Chemistry, qualitative analysis	105	.....	3
Chemistry, quantitative analysis	105	.....	4
Physical chemistry, I, II	120	.....	5–6
Physical chemistry laboratory, I, II	60	.....	5–6
Organic chemistry I, II	120	.....	5–6
Organic chemistry preparations I	90	.....	5
Qualitative organic analysis	90	.....	6
Strength of materials	45	.....	4
Electrical engineering fundamentals	60	.....	7
IV. Specialized chemical engineering	765	24.4	.....
Industrial chemistry	195	.....	5–8
Industrial chemistry laboratory	150	.....	7
Chemical engineering	180	.....	5,6,8
Chemical engineering laboratory	150	.....	7
Electives (2 half courses)	90	.....	7–8
V. Other	270	8.6	.....
Athletics	60	.....	1–2
Military science	180	.....	1–4
Quiz	30	.....	1–2
Total	3,135	100.0	.....

NOTE.—Reconstruction is made on the basis of instruction offered during the academic year, which is assumed to have a total duration of 30 weeks (15 weeks per term). Losses of instruction time due to holidays coming during the week are not accounted for.
Source: *MIT Bulletin*, catalog issue for 1952.

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TABLE IV–B–12A.—*Chemical engineering—Technology of silicates: 5-year institute curriculum, 1955 (Specialty 0806)*

Subjects of instruction	Hours total	Lecture	Laboratory	Seminar and practice session	Course projects	Hours per week per term									
						1	2	3	4	5	6	7	8	9	10
1. Foundations of Marxism-Leninism	250	160	.....	90	.....	4	3	4	4	.....	.....	.....	.....	.....	DP
2. Political economy	140	100	.....	40	.....	.....	.....	.....	.....	2	3	2	3	.....	DP
3. Foreign language	252	.....	.....	252	.....	2	2	2	2	.....	.....	.....	.....	.....	DP
4. Higher mathematics	328	164	10	154	.....	8	7	4	.....	.....	.....	.....	.....	.....	DP
5. Physics	232	132	70	30	.....	.....	6	4	4	.....	.....	.....	.....	.....	DP
6. Descriptive geometry and drafting	208	36	.....	172	.....	8	4	.....	.....	.....	.....	.....	.....	.....	DP
7. Technology of metals	84	36	12	36	.....	.....	.....	.....	.....	2	4	.....	.....	.....	DP
8. Theoretical mechanics	100	60	.....	40	.....	.....	4	2	.....	.....	.....	.....	.....	.....	DP
9. Strength of materials	100	50	20	30	.....	.....	.....	2	4	.....	.....	.....	.....	.....	DP
10. Theory of machines and mechanisms: machine components and lifting transportation equipment	146	102	.....	20	24	.....	.....	.....	2	5	2	.....	.....	.....	DP
11. Inorganic chemistry	222	100	122	.....	.....	7	6	.....	.....	.....	.....	.....	.....	.....	DP
12. Analytical chemistry	290	30	260	.....	.....	.....	.....	9	8	.....	.....	.....	.....	.....	DP
13. Organic chemistry	170	90	80	.....	.....	.....	.....	5	5	.....	.....	.....	.....	.....	DP
14. Physical chemistry	252	102	150	.....	.....	.....	.....	.....	.....	8	9	.....	.....	.....	DP
15. Colloidal chemistry	72	32	40	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	DP
16. Mineralogy and crystallography	108	50	58	.....	.....	.....	.....	.....	.....	6	.....	.....	.....	.....	DP
17. General power engineering	138	86	24	16	12	.....	.....	.....	3	5	.....	.....	.....	.....	DP
18. General electrical engineering	132	68	40	24	.....	.....	.....	.....	.....	4	5	.....	.....	.....	DP
19. General chemical technology	102	82	20	.....	.....	.....	.....	.....	.....	.....	4	3	.....	.....	DP
20. Processes and equipment in chemical technology	150	72	60	18	.....	.....	.....	.....	.....	.....	5	5	.....	.....	DP
21. Automatization and control of chemical processes	72	36	36	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	DP
22. Chemistry of silicates and physical chemistry	112	54	58	.....	.....	.....	.....	.....	.....	.....	.....	4	4	.....	DP
23. Safety and fire prevention	40	30	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	DP
24. Economics of construction materials industry	40	40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	DP
25. Organization and planning of enterprises	60	48	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	DP
26. Construction and sanitary techniques	36	36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	DP
27. General technology of silicates	178	90	88	.....	.....	.....	.....	.....	.....	.....	.....	5	4	4	DP
28. Machines and equipment of silicate industry	106	56	30	.....	20	.....	.....	.....	.....	.....	.....	2	7	.....	DP
29. Ovens, driers and gas generating equipment	76	56	20	.....	.....	.....	.....	.....	.....	.....	.....	2	4	.....	DP
30. Specialization subjects	216	120	96	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18	DP
31. Physical education	136	.....	.....	136	.....	2	2	2	2	.....	.....	.....	.....	.....	DP
Total	4,548	2,118	1,304	1,070	56	31	34	34	34	32	32	31	30	30	DP
Weeks per term	.....	.....	.....	.....	.....	18	16	18	16	18	12	18	10	12	18

DP—Diploma project
Source: *Source Z*, pp. 201–02.

SUPPLEMENT TO TABLE IV–B–12A.—*Additional Information on Curriculum*

I. *Optional Courses:*

1. Physical education
2. Physical-chemical methods of analysis
3. History of technology
4. Anti-corrosion

II. *Specialization Courses and Electives:*

1. Specialization: Technology of Cementitious Materials
   1. Technology of cementitious materials
   2. Equipment of plants of cementitious materials
2. Specialization: Technology of Ceramics and Refractories
   1. Technology of ceramics and refractories
   2. Equipment of ceramics plants
3. Specialization: Technology of Glass
   1. Technology of glass
   2. Equipment of glass-making plants

III. *Time Budget in Weeks:*

1. Instruction	138
2. Examinations	30
3. Practice assignments	20
4. Diploma project	18
5. Vacations	45
Total	251

IV. *Instruction Schedule:* see Table IV–B–12A.

V. *Examination Schedule:*

1. Graded examinations	36
2. Qualifying examinations	53
3. Graded course work	1

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TABLE IV–B–13.—*Civil engineering—Hydrotechnical structures and power stations: Comparison of 1955 general and individual 5-year curricula (Specialty 1203)*

Subject	Total, hrs.		Lecture		Laboratory		Seminar and practice session		Hours per week per term																			
									1		2		3		4		5		6		7		8		9		10	
	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
1. Principles of Marxism and Leninism	250	250	160	160	.....	.....	90	90	4	4	3	3	4	4	4	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2. Political economy	140	140	100	100	.....	.....	40	40	.....	.....	.....	.....	.....	.....	.....	.....	2	2	3	3	2	2	3	3	.....	.....	.....	.....
3. Foreign language	256	256	.....	.....	.....	.....	256	256	2	2	2	2	2	2	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4. Higher mathematics	394	394	190	190	16	16	188	188	8	8	6	6	5	5	4	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5. General chemistry	120	120	70	70	50	50	.....	.....	4	4	3	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6. Physics	224	224	124	124	80	80	20	20	4	4	5	5	4	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7. Descriptive geometry	104	104	52	52	.....	.....	52	52	4	4	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8. Drafting and drawing	120	120	.....	.....	120	120	.....	.....	4	4	3	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
9. Geodesy	104	104	52	52	52	52	.....	.....	4	4	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
10. Theoretical mechanics	184	184	100	100	.....	.....	84	84	.....	.....	4	4	4	4	3	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
11. Strength of materials	188	188	102	102	54	54	32	32	.....	.....	.....	.....	6	6	5	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
12. Construction mechanics and theory of elasticity	216	216	108	108	.....	.....	108	108	.....	.....	.....	.....	.....	.....	.....	.....	5	5	6	6	3	3	.....	.....	.....	.....	.....	.....
13. Construction materials and metals	136	136	64	64	72	72	.....	.....	.....	.....	4	4	4	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
14. Electrical engineering and equipment	96	96	64	64	32	32	.....	.....	.....	.....	.....	.....	.....	.....	6	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
15. Machine design	252	252	132	132	120	120	.....	.....	.....	.....	.....	.....	.....	.....	3	3	9	9	3	3	.....	.....	.....	.....	.....	.....	.....	.....
16. Organization of construction projects	238	238	154	150	56	50	28	38	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	4	3	4	4	4	4	5	.....	.....
17. Architecture	54	54	34	34	10	10	10	10	.....	.....	.....	.....	.....	.....	.....	.....	3	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
18. Engineering geology	90	90	45	45	45	45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19. Mechanics of water tables	98	98	70	70	14	14	14	14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	2	4	5	.....	.....	.....	.....	.....	.....
20. Engineering construction (steel)	70	70	46	46	10	10	14	14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	5	.....	.....	.....	.....	.....	.....	.....
21. Engineering construction (cement)	98	112	88	80	10	10	.....	22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	7	6	.....	.....	.....	.....	.....	.....
22. Engineering construction (wood)	42	42	32	32	10	6	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	3	.....	.....
23. Hydraulics	194	194	88	88	64	64	42	42	.....	.....	.....	.....	.....	.....	3	3	5	5	4	4	.....	.....	.....	.....	.....	.....	.....	.....
24. Hydrology and hydrometry	68	68	44	44	14	14	14	14	.....	.....	.....	.....	.....	.....	.....	.....	3	3	1	1	.....	.....	.....	.....	.....	.....	.....	.....
25. Hydraulic machines	.....	56	.....	42	.....	7	.....	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	.....
26. Hydro-electric stations and machines	168	.....	112	.....	28	.....	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	6	.....	2	.....	.....	.....
27. Hydro-technical installations	196	.....	126	.....	28	.....	42	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	4	.....	6	.....	.....	.....	.....	.....
28. Economics of water resources	70	70	60	60	.....	.....	10	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	5	.....	.....	5
29. Waterways and ports	70	70	56	54	14	10	0	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	5	5	.....	.....
30. Drainage and irrigation	70	70	70	54	0	10	0	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	5	.....	.....
31. Safety engineering and fire prevention	42	42	30	30	12	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	3	.....	.....	.....
32. Elective	70	.....	70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	.....	.....
33. Subjects of specialization	.....	364	.....	270	.....	56	.....	38	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8	.....	12	.....	6	.....	.....
34. Physical education	136	136	.....	.....	.....	.....	136	136	2	2	2	2	2	2	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	4,558	4,558	2,439	2,417	771	770	1,348	1,371	36	36	36	36	31	31	32	32	32	32	30	30	32	32	27	27	24	24	.....	.....

a—General curriculum.
b—Individual curriculum for Moscow Construction Institute.

Source: *Source Z*, pp. 279–82, as reproduced in *ASEE* reports, pp. 896–98.

Diploma Project ←→ Diploma Project

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SUPPLEMENT 1 TO TABLE IV–B–13.—*Additional Information on Curriculum*

I. *Optional Courses* (Curriculum b):

1. Introduction to hydrodynamics
2. History of engineering
3. History of technology
4. Physical education
5. Development of hydrotechnical installations
6. Applied thermodynamics and hydrotechnical projects
7. Testing of hydroelectric stations
8. Development of hydroelectric stations
9. Nonstationary regimes in hydro installations
10. Special problems in design of hydroelectric stations
11. Special problems in hydraulics of variable mass
12. Special problems of mechanization
13. Operation and maintenance of hydroelectric power stations

(Curriculum a):

1. Physical education
2. Technical drafting and sketching
3. Testing of power installations
4. History of technology
5. Automatics in construction of hydroelectric stations

II. *Specialization Courses and Electives:* (Curriculum b)

1. Specialization: River hydrotechnical installations
   1. Hydrotechnical structures
   2. Hydroelectric power stations
2. Specialization: Hydroelectric power stations
   1. Hydroelectric power stations
   2. Hydrotechnical installations
   3. Electrical equipment of power stations
3. Specialization: Hydromechanization of earth works
   1. Hydromechanization
   2. Hydrotechnical installations
   3. Hydroelectric power stations

(Curriculum a): unknown

III. *Time Budget in Weeks:*

	Curriculum a	*Curriculum b*
1. Instruction	142	142
2. Examinations	29	29
3. Practice assignments	29	29
4. Diploma project	16	16
5. Vacations	35	35
Total	251	251

IV. *Instruction Schedule:*

	Weeks in term									
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Identical for *a* and *b*	18	16	18	16	18	14	14	14	14	16

Hours per week in term

See Table IV–B–13

V. *Examination Schedule:*

	Curriculum a	*Curriculum b*
1. Graded examinations	41	41
2. Qualifying examinations	55	55
3. Graded course work	5	4

SUPPLEMENT 2 TO TABLE IV–B–13.—*Courses in the Soviet program of training in civil engineering, with specialization in hydrotechnical structures, late 1930's*

These data were abstracted from a refugee report: N. Ivanov, *Higher Technical Training in the U.S.S.R.*, mimeographed series, No. 42, RP–U.S.S.R., 1953. This refugee was a student in the Moscow Construction (Civil) Engineering Institute, and the program of study refers to the late 1930's.

This institute had six divisions (civilian and industrial structures; hydrotechnical structures; highway construction; mechanization of construction; water supply, sewerage and sanitation; heating and ventilation engineering), which offered narrow specialization in the respective fields. The refugee was a student in the division of hydrotechnical structures and upon completion of training he was assigned as civil engineer on the construction of Kuibyshev on the Volga hydroelectric power station and dam (the construction of which was supervised by Gulag NKVD—Central Administration of Forced Labor Camps of the Soviet Ministry of the Interior [secret police]). The first 2 years of the 5-year course were devoted to general engineering courses, which he described as follows:

1. *Higher mathematics.*—Total number of class instruction hours during 2 years was about 350. The course covered analytical geometry, plane and special; differential and integral calculus (including the solution of differential equations); fundamentals of vector analysis; series and their application; higher algebra; nomography. The course included also slide rule calculations practice.
2. *Theoretical mechanics.*—Covered statics, kinematics, and dynamics.
3. *Descriptive geometry and advanced graphics.*—Included, among "other" topics, the theory of perspectives, graphic and projective transformations in their application to engineering problems.
4. *Physics.*—"Extensive" coverage, including optics, electricity, and atomic physics.
5. *Chemistry.*—"Quite simplified," a course which offered only general inorganic chemistry (organic chemistry was not taught at all).
6. *Fluid mechanics.*—Very detailed and thorough course, which included the "most complex" equations of (hydro) dynamics. This course was taught in other departments of the same institute in a "simplified" version without theoretical refinements.
7. *Strength of materials* (and materials test laboratory).—Taught in this institute, as well as in other engineering schools, very thoroughly. It was considered one of the most important courses and the study of this subject was spread over the first 2 years.
8. *Foreign language.*—Taught to the extent of enabling students to make technical literature translations from a foreign language into Russian. Students not taught conversational aspects nor could they speak the language freely. Two hours per week for the duration of the first 3 academic years were devoted to foreign language.

Other subjects during the first 2 years of study:

9. *Physical culture.*—Consisted primarily of athletic exercises, supplemented by military drill exercises.
10. *Drawing and engineering drafting.*
11. *Construction materials.*
12. *"Political subjects."*—Consisted of political economy, dialectical materialism, and historical materialism.
13. *Geodesy and geodetic surveying.*

Courses in the last 3 academic years were specialized engineering courses consisting of—

14. Hydrology.
15. "Hydrometry" (hydromechanics).
16. Hydrogeology.
17. Hydraulic structures.
18. Structural mechanics.
19. Structures 1: metal structures design.
20. Structures 2: reinforced concrete structures design.
21. Structures 3: wooden structures design.
22. Structures 4: bridges and bridge design.
23. Structures 5: components design (apparently covers such unit design as arches, building frames, etc., with stress on indeterminate structural components).
24. Organization and management of construction undertakings.
25. Amelioration and development.
26. Fire prevention and safety.
27. *Political subjects*—Political economy and history of the Communist movement in the U.S.S.R.
28. *Foreign language.*

N. Ivanov admits that he may have left out some subjects or aggregated subdivisions into larger courses. In total, during

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the 5 years of study he was required to pass examinations in 42 subjects.

The institute offered civilian and military civil engineering specializations. Military specialization required one additional year of study (total 6 years), which was devoted primarily to: military tactics, light armaments, military drill, military regulations and code, military bridges, ferry construction and ford operations, blasting and demolition operations, combat engineering, and additional courses in athletics.

The last term was devoted to the diploma project.

During the period of study the student was assigned to industrial practice, which consisted of assignment on some construction project.

Classroom instruction, laboratory exercises, etc., were conducted 6 days per week, with six hours' duration 3 days per week and 8 hours' duration the other 3 days. All types of instruction lasted 42 hours per week. In addition, the student had to spend "many hours" in self-preparation.

Grading was strict. More than two failures resulted in expulsion. Repeat examinations were permitted only once. Failure in one subject deprived the student of his monthly stipend.

TABLE IV–B–14.—*Operations and maintenance engineering—Automotive transport: 5-year institute program, 1955 (Specialty 1609)*

Subject	Total hours	Lecture	Laboratory	Seminar and practice sessions	Hours per week per term									
					1	2	3	4	5	6	7	8	9	10
1. Principles of Marxism and Leninism	250	160	.....	90	4	3	4	4	....	....	....	....	....	
2. Political economy	140	100	.....	40	....	....	....	....	2	3	2	3	....	
3. Foreign language	256	.....	.....	256	2	2	2	2	....	....	....	....	....	
4. Higher mathematics	378	189	16	173	8	6	5	3	....	....	....	....	....	
5. General chemistry	120	70	50	.....	4	3	....	....	....	....	....	....	....	
6. Physics	242	142	80	20	5	5	4	....	....	....	....	....	....	
7. Descriptive geometry	90	50	.....	40	5	....	....	....	....	....	....	....	....	
8. Machine drawing	170	.....	.....	170	3	3	5	2	....	....	....	....	....	
9. Theoretical mechanics	200	100	.....	100	....	4	4	4	....	....	....	....	....	
10. Strength of materials	188	102	34	52	....	....	6	5	....	....	....	....	....	
11. Theory of mechanisms and machines	154	102	16	36	....	....	....	4	5	....	....	....	....	
12. Detail design and lifting machines	183	120	18	45	....	....	....	....	6	5	....	....	....	
13. Shop	166	.....	166	.....	3	4	....	3	....	....	....	....	....	
14. Technology of metal working	199	166	33	.....	....	4	3	....	2	3	....	....	....	
15. Metallurgy and hot metal working	102	68	34	.....	....	....	....	3	3	....	....	....	....	
16. Tolerances and technical measurements	60	30	30	.....	....	....	....	....	....	4	....	....	....	
17. Electrical engineering and equipment	169	97	58	14	....	....	....	....	....	4	5	3	....	
18. Heat engineering	132	81	51	.....	....	....	....	....	4	4	....	....	....	
19. Hydraulics and hydraulic machines	108	54	36	18	....	....	....	....	4	3	....	....	....	
20. Automobile	239	151	88	.....	....	....	....	....	....	....	5	4	....	
21. Automobile engines	202	132	42	28	....	....	....	....	....	6	8	....	....	
22. Fuel, lubricants	70	40	30	.....	....	....	....	....	....	....	5	....	....	
23. Automobile transportation	78	78	.....	.....	....	....	....	....	....	....	....	3	3	
24. Automobile maintenance techniques	91	65	26	.....	....	....	....	....	....	....	....	3	4	
25. Assembly and overhaul of automobiles	161	107	54	.....	....	....	....	....	....	....	5	3	4	
26. Economics of transportation	65	55	.....	10	....	....	....	....	....	....	....	5	....	
27. Organization of motor pools	65	65	.....	.....	....	....	....	....	....	....	....	....	5	
28. Technical buildings	39	39	.....	.....	....	....	....	....	....	....	....	....	3	
29. Automobile highways	28	28	.....	.....	....	....	....	....	....	....	2	....	....	
30. Safety engineering and fire prevention	39	30	9	.....	....	....	....	....	....	....	....	....	3	
31. Physical education	136	.....	.....	136	....	2	2	2	....	....	....	....	....	
Total	4,520	2,421	871	1,228	36	36	35	32	26	32	32	24	22	....

Diploma Project

Source: *Source Z*, pp. 371–72, as reproduced in *ASEE* reports, pp. 894–95.

SUPPLEMENT TO TABLE IV–B–14.—*Additional Information on Curriculum*

I. *Optional Courses:*

1. Physical education
2. Highway and traffic code
3. Motorcycles
4. Tractors
5. Gas turbines
6. History of technology
7. Prospective development of automotive transport

II. *Specialization Courses and Electives:* None

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III. *Time Budget in Weeks:*

1. Instruction	141
2. Examinations	29
3. Practice assignments	23
4. Diploma project	17
5. Vacations	41
Total	251

IV. *Instruction Schedule:*

	Weeks in term									
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
	18	16	18	16	18	15	19	13	13	17

Hours per week in term: see Table IV–B–14.

V. *Examination Schedule:*

1. Graded examinations	41
2. Qualifying examinations	52
3. Graded course work	8

TABLE IV–B–15.—*Engineering economics—Economics and organization of machine building industry: Comparison of 1955 and 1959 curricula (Specialty 1709)* [a]

Subjects of instruction	1955 program (5 years)					1959 program (5 1/2 years)				
	Term	Lecture	Laboratory	Seminar or practice session	Total	Total	Lecture	Laboratory	Seminar or practice session	Term
1. (A) Foundations of Marxism-Leninism	4–7	140	.....	90	230	none	.....	.....	.....	.....
(B) History of Communist Party	.....	.....	.....	.....	none	220	120	.....	100	2–6
2. Political economy	1–4	200	.....	100	300	300	180	.....	120	3–7
3. Historical and dialectical materialism	2–3	60	.....	20	80	90	50	.....	40	7–8
4. Economic geography of U.S.S.R.	1	70	.....	20	90	90	70	.....	20	1–2
5. Higher mathematics	1–3	150	.....	150	300	380	190	.....	190	1–5
6. Physics	2–3	100	50	20	170	200	110	60	30	3–5
7. Chemistry	1	50	40	.....	90	90	60	30	.....	1–2
8. Foreign language	1–4	.....	.....	140	140	250	.....	.....	250	1–6
9. Descriptive geometry and drafting	1–2	30	.....	120	150	160	40	.....	120	1–3
10. Theoretical mechanics	2–3	60	.....	40	100	110	60	.....	50	4–5
11. Strength of materials	3–4	20	40	.....	60	130	80	.....	50	5–6
12. Theory of machines and mechanisms	4–5	50	10	40	100	130	80	.....	50	6–7
13. Electrical technology and equipment of machine building plants	3–4	80	40	.....	120	130	70	60	.....	6–7
14. Electrical engineering	.....	.....	.....	.....	none	50	40	10	.....	6
15. Power engineering	5	50	20	10	80	70	40	10	20	7
16. General statistics	5–6	60	.....	30	90	70	40	.....	30	8
17. Industrial statistics	7	50	.....	20	70	60	40	.....	20	8
18. Accounting and bookkeeping	7–8	100	.....	60	160	130	70	.....	60	9–10
19. Materials technology	3–5	120	60	20	200	200	140	60	.....	5–7
20. Metal cutting, machine tools and instruments	4–5	100	100	.....	200	160	90	40	30	7–8
21. Technology of machine building	5–7	100	50	50	200	170	100	40	30	8–9
22. Automation in machine building	.....	.....	.....	.....	none	90	60	.....	30	9–10
23. Technical norm setting	5–6	70	20	50	140	160	80	.....	80	9–11
24. Economics of machine building	6–8	130	.....	60	190	130	80	.....	50	8–9
25. Organization and planning of machine building	6–9	200	50	130	380	320	160	.....	160	8–11
26. Mathematical methods of planning, and computers	.....	.....	.....	.....	none	130	50	.....	80	9–10
27. Labor law	9	60	.....	.....	60	50	50	.....	.....	11
28. Financing and credit in Soviet industry	9	40	.....	10	50	50	40	.....	10	10
29. Special elective	.....	.....	.....	.....	none	50	.....	.....	50	2
30. Principles of machine building (advanced)	.....	.....	.....	.....	none	70	.....	.....	70	11
31. Physical education	1–4	.....	.....	140	140	140	.....	.....	140	5–8
32. Special seminar on planning	9	.....	.....	50	50	none	.....	.....	.....	.....
33. Industrial safety	9	40	.....	.....	40	none	.....	.....	.....	.....
Grand total	.....	2,170	460	1,410	4,040	4,380	2,190	310	1,880	.....

[a] The 1959 curriculum is for students admitted to higher educational establishments without 2 or more years of work experience. The curriculum for students with 2 years' experience is based on 4 years, 10 months, of study, with 4,310 instruction hours and no requirement for full-time employment—part-time study during terms 1–4.

Sources: 1955: *Source X*, loose-leaf program. The author is indebted to Professor R. N. Anthony of the Harvard Business School for providing him with original copies of this study plan.
1959: *Source Y*, Folio 66.

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SUPPLEMENT TO TABLE IV–B–15.—*Additional Information on Curriculum*

I. *Optional Courses:*

1. Physical education
2. Foreign language

II. *Specialization Courses and Electives:* unknown.

III. *Time Budget in Weeks:*

	1955	1959
1. Instruction	130	[a]168
2. Examinations	29	32
3. Practice assignments	26	[b]22
4. Diploma project and state examinations	20	16
5. Vacations	46	48
Total	251	286

[a] Among these, 72 weeks are with full employment—part-time study.
[b] All practice assignments are on a full-time basis, *without* part-time study.

IV. *Instruction Schedule:*

	Weeks in term									
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1955 (5 years)	18	16	18	16	16	9	18	9	10	20	..
1959 (5½ years)	18	18	18	18	18	18	18	12	18	12	16

	Hours per week in term										
1955	32	32	32	32	32	32	32	26	25	DP	..
1959	[b]16	[b]16	[b]16	[b]16	30	30	32	31	34	30	[a]11

DP—Diploma project.

V. *Examination Schedule:*

	1955	1959
1. Graded examinations	38	41
2. Qualifying examinations	39	47
3. Graded course work	none	1

[a] Course work is taken while diploma project is prepared.
[b] Part-time study with full-time employment.

APPENDIX IV–B–16.—*Diploma Project Requirements in a Soviet Engineering Institute*

A "diploma project" (usually a thesis or a project of some kind) is required of higher educational establishment graduates. Study of what is expected of a student in the thesis is a good method of evaluating the curriculum of technical higher educational establishments.

An article by Dr. M. E. Egorov, of the Moscow Automechanical Institute, gives some idea of what is involved. He writes describing the work at the institute[1] and presents an outline of the thesis required of students there:

The diploma project is the last stage in the course of special education, adding up the total of the knowledge received by the student in the higher educational establishment, and reflects the specialty which the student is mastering and his future work field.

In our opinion, it would be wise to make it a rule that the industrial practice of the students be closely tied in with the nature of the diploma project. . . .

The diploma project should represent a completed work, explaining a complex of theoretical, engineering, constructing, analytical and accounting, organizational, economic and research problems.

For the actual fulfillment of the diploma project the students must be given a full semester. . . .

A diploma project in the specialty "Machine construction engineering" must reflect the practical application of theoretical knowledge received by the student in the field of the mechanical processing of metals and the assembly of machines, a correct distribution and use of equipment, as rational a use of equipment as possible, as well as of workers, tools and industrial areas, the most economical use of the whole setup of the production, etc. . . .

A consideration of the specialty, place of work, and the practicalness of the problem are necessary factors in the selection of a subject for the problem. . . .

But, within the limits of each branch of machine construction one must select the type of machine construction: machine tool construction, engine construction, turbine construction, pump and compressor construction, etc. In selecting the subject for the project this factor must be taken into account too.

In accordance with the propositions outlined above, the following themes may serve as examples for the specialty "Machine construction engineering."

[1] *VVSh*, No. 1, 1946, pp. 15–20.

1. A plan of a machine assembly shop for the production of metalworking tools (of a certain type and size).
2. A plan of a machine assembly shop for the production of automobile or tractor engines, or other engines of a certain type.
3. A plan for a machine assembly shop for the production of automobiles or tractors of a certain type. . . .
9. A plan for a complex of several metal working and assembly shops connected with a general technological process. . . .
15. A plan for the reconstruction of existing shops and plans and making existing production more efficient. . . .

For the specialty "machine construction engineering," the contents of the diploma project on one theme or another may be divided into the following fundamental sections:

1. The production problem (program, study of the subject and technical conditions of it).
2. Designing section.
3. Engineering section.
4. Accounting and analysis section pertaining to the engineering, construction and the shop or part of the shop.
5. Planning and general subdivisions of the productive and auxiliary rooms in accordance with the nature of the theme.
6. Organization of production (in accordance with the nature of the theme).
7. Economic section (in accordance with the nature of the theme).
8. Explanatory notes.

Let us now examine the contents of the basic sections of the project. First of all, the production problem. This section of the project must include:

1. The nomenclature of the parts, their quantity, weight, planned price, and the total value of the annual production of the shop.
2. A short description and analysis of the construction of the auxiliary products going with the product (study of the object to be produced).
3. Technical conditions for the preparation of the product made and of its basic parts with which the technological process is concerned.
4. Working sketches of the basic parts and assembly sketches of the product (may be copies).

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5. Sketches or plans of the raw materials for the parts, to which the technological process is applied (may be copies).
6. Specifications for the details.
7. Information on the gross and net weights for production for a year, with indication of the type of raw materials (casting, founding, stamping, rolling) and the amount of scrap.

The designing and engineering sections of the project include:

1. Elaboration of the working sketches of 1 or 2 basic parts and the materials for them, with a calculation and indication of the surpluses, allowances and quality of processing, and likewise a working sketch of one assembly center.
2. More detailed charts in accordance with the established form for several basic parts (the number of parts may vary depending upon their nature and complexity, but on the average should be 4 or 5) with all the calculations and completions of each chart.
3. A calculation of the methods of cutting for the basic operations of one part (speed of cutting, supply, depth of cutting, strength of cutting, torque, power).
4. A calculation of the processing time of the elements for the basic operations of one part.
5. A generalization of the operational scheme for the parts, for which detailed processing charts are not made.
6. Drawings or sketches of the processing (sketches for instruction charts) illustrating the process, for 3 to 5 parts out of those for which processing charts were made.
7. An analysis of the construction of 2 or 3 different adaptations used in the planning of the engineering process (for processing, assembly, control).
8. Analysis of the design of cutting and measuring tools used in the planning of the engineering process.
9. An analysis of the tolerances and settings according to the National Standards system for the details of one subassembly center, including those for which engineering charts were made, with a calculation and justification of the settings selected.
10. Engineering charts for assembly according to the established form.
11. Information as to the time required for the subassembly and assembly of the whole machine.
12. Sketches or drawings of the transfer points (sketches to the instruction charts) or engineering schemes of the assembly summarizing the process of the general assembly of one unit or machine.
13. A reworking of the design of the parts caused by engineering requirements, if this becomes necessary.

The accounting and analytical part of the project assumes:

1. A calculation of one of the basic parts or subassemblies prepared by the shop, if its design changes in connection with the engineering.
2. A calculation of the elements of the equipment for processing or assembly or control.
3. A calculation of the cutting and measuring tools.
4. A calculation of the quantity required of equipment to fulfill the production program:
   (*a*) A table of the load on the machines;
   (*b*) Determination of the coefficients of the load;
   (*c*) A chart of the load of the machines;
   (*d*) Information on the equipment with engineering characteristics and cost.
5. A calculation of the number of assembly points:
   (*a*) Tables of the load of the assembly points.
   (*b*) A chart of the load.
   (*c*) Information as to the equipment for the assembly points.
6. A determination of the quantity required of tools, appliances, accessories, and materials:
   (*a*) Information on the working tool;
   (*b*) Information on the measuring tool;
   (*c*) Information on the electric motors;
   (*d*) Information as to the materials.
7. A calculation of the workers required and a detailed list of the staff:
   (*a*) for the machine shop;
   (*b*) for the assembly shop.
8. A calculation of the quantity of the necessary weight-lifting and transportation equipment for the machine and assembly shops, a selection of the types and information about them.
9. A calculation of the area of the machine shop:
   (*a*) The machine tool division;
   (*b*) The shop storage facilities for material and semi-finished products;
   (*c*) Intermediate storage;
   (*d*) Control section;
   (*e*) Sharpening branch;
   (*f*) The section for sharpened tools.
10. A calculation of the area of the assembly shop.
11. A determination of the basic sizes and general area of the machine and assembly shop.
12. A calculation of the toolshop according to technical and economic indices:
   (*a*) Calculation of the quantity of equipment, and information as to its characteristics;
   (*b*) A calculation of the area of the shop;
   (*c*) A calculation of the number of workers and of the staff.
13. A calculation of the repair shop according to technical and economic indices:
   (*a*) Calculation of the amount of equipment and information on its characteristics.
   (*b*) Calculation of the area of the shop.
   (*c*) Calculation of the number of workers and of the staff.
14. A calculation of the area of the office for the shop and of space for the personnel's use according to the National Standards.
15. A calculation of the power section; electricity, compressed air, gas, steam, and water.

Planning.—This section of the project should include:

1. Planning of the equipment of the machine shop (or branch) and a distribution of the accessory branches (warehouses, control section, sharpening section, sharpened tool storage, etc.):
   (*a*) A plan of the shop or branch on a scale of 1:100;
   (*b*) A diagram of the movement of the parts.
2. Planning of the equipping of the assembly shop or branch, with information as to the assembly stands, and working places for the machinists and the subassembly workers:
   (*a*) A plan of the shop (or branch) on a scale of 1:100;
   (*b*) A diagram of the movement of the details and parts.

If the plan of the machine or assembly shop branch is worked out in detail, then it is necessary to give a plan of its general subdivisions.

3. Determination of the height of the machine and assembly shops:
   (*a*) Lateral section on a scale of 1:50;
   (*b*) Longitudinal section on a scale of 1:50.
4. A detailed plan of the working place of the machine operator or assembler.
5. A plan of the toolshop.
6. A plan of the repair shop.
7. A plan of the office and workers' quarters.
8. A general breakdown of all the production shops, skilled workmen's shops, auxiliary branches and service quarters in the building.

The section of the project which we called organization of production should include:

1. An organization of the production process and working places in the machine and assembly shops.
2. Organization of technical control.
3. Organization of internal transportation.
4. Organization of the lubrication management.
5. Organization of shop storage areas.
6. Organization of tool management.
7. Organization of the repair work in the shop.
8. Organization of the management of the shop.

The economic part of the project should include:

1. A determination of the general demand for materials, fuel and power.

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2. A determination of the annual budget for workers' wages.
3. A determination of the shop's expenses.
4. A budget of the production and a determination of the cost of production.
5. A determination of the basic facilities of the shop.
6. Engineering and economic indices for the shop.

Finally, the last part of the project—explanatory notes—should contain a discussion of the following basic problems:

1. A description of the production problem, a description and analysis of the design of the parts and the engineering conditions for their production.
2. A description of the nature of the production.
3. Basic principles used as the basis for the project.
4. A method of calculating the materials required and the scrap.
5. The work methods of the shops.
6. Engineering and economic indices for the shop.
7. Description of engineering processes; justification for the methods of processing taken in the project; methods of processing of the equipment selected, as well as of the accessories, tools, methods of cooling and the work time established.
8. A description of the special equipment, tools, and accessories; calculations of the design of the parts, accessories, and tools.
9. A determination of the number of machine tools and the load coefficients.
10. The nature of the drive of the equipment.
11. Methods of technical control.
12. Calculation of the workers.
13. Calculation of the areas of the shops, storage areas, and auxiliary rooms.
14. Calculation of the quantity of means of transportation.
15. Calculation of the tool and repair shops.
16. Descriptions of the planning of the equipment and the planning of all the shops and repair shops, the general subdivisions of the shops and the justification of the decisions reached.
17. A calculation of the power unit (electricity, compressed air, steam, gas, water).
18. The organization of production and the economic aspect of the contents indicated above are included in an explanatory note divided by sections.
19. Conclusions—in regard to the project on the basis of engineering and economic results.

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TABLE IV–B–17.—*Agronomy: 5-year program in agricultural institutes, 1955 curriculum (Specialty 1502)*

Subjects of instruction	Hours total	Lecture	Laboratory	Seminar and practice session	Course projects	Hours per week per term									
						1	2	3	4	5	6	7	8	9	10
1. Foundations of Marxism-Leninism	250	160	.....	90	.....	4	3	4	4	....	....	....	....	....	DP
2. Political economy	140	100	.....	40	.....	....	....	....	3	2	2	2	....	....	DP
3. Foreign language	240	.....	.....	240	.....	2	2	2	2	....	....	....	....	....	DP
4. Higher mathematics	70	40	.....	30	.....	4	....	....	....	....	....	....	....	....	DP
5. Physics	140	70	70	.....	.....	4	4	....	....	....	....	....	....	....	DP
6. Meteorology	70	30	40	.....	.....	....	....	....	5	....	....	....	....	....	DP
7. Inorganic and analytical chemistry	200	70	130	.....	.....	6	6	....	....	....	....	....	....	....	DP
8. Organic chemistry	120	60	60	.....	.....	....	4	3	....	....	....	....	....	....	DP
9. Physical and colloidal chemistry	60	30	30	.....	.....	....	....	3	....	....	....	....	....	....	DP
10. Botany	190	70	120	.....	.....	6	5	....	....	....	....	....	....	....	DP
11. Zoology	70	30	40	.....	.....	4	....	....	....	....	....	....	....	....	DP
12. Physiology and anatomy of animals	70	30	40	.....	.....	....	....	2	2	....	....	....	....	....	DP
13. Microbiology	70	30	40	.....	.....	....	....	4	....	....	....	....	....	....	DP
14. Plant physiology and biochemistry	140	70	70	.....	.....	....	....	3	6	....	....	....	....	....	DP
15. Soil science and geology	180	80	70	20	10	....	3	4	4	....	....	....	....	....	DP
16. Geodesy	50	20	30	.....	.....	....	3	....	....	....	....	....	....	....	DP
17. General soil cultivation	140	60	50	20	10	....	....	....	....	6	3	....	....	....	DP
18. Agrochemistry	130	40	80	.....	10	....	....	....	....	7	....	....	....	....	DP
19. Plant growing	160	70	50	30	10	....	....	....	....	....	5	5	....	....	DP
20. Darwinism	40	40	.....	.....	.....	....	....	....	....	....	4	....	....	....	DP
21. Selection and seed culture	110	60	50	.....	.....	....	....	....	....	....	....	5	....	....	DP
22. Entomology	140	70	70	.....	.....	....	....	....	....	4	7	....	....	....	DP
23. Animal breeding	180	90	50	40	.....	....	....	....	....	6	3	2	....	....	DP
24. Soil conservation	70	30	.....	30	10	....	....	....	....	4	....	....	....	....	DP
25. Mechanization and electrification of agriculture	260	100	160	.....	.....	....	....	5	4	3	2	2	....	....	DP
26. Technology of agricultural produce	90	40	50	.....	.....	....	....	....	....	....	....	....	....	7	DP
27. Economics of socialist agriculture	70	40	.....	20	10	....	....	....	....	....	....	3	....	....	DP
28. Organization of socialist agricultural enterprises	160	80	.....	80	.....	....	....	....	....	....	....	4	....	6	DP
29. Statistics	40	20	.....	20	.....	....	....	....	....	....	....	2	....	....	DP
30. Accounting and bookkeeping	40	10	.....	30	.....	....	....	....	....	....	....	....	....	3	DP
31. Specialty courses and electives	340	200	100	40	.....	....	....	....	....	....	6	5	....	14	DP
32. Physical education	130	.....	.....	130	.....	2	2	2	2	....	....	....	....	....	DP
Total	4,160	1,840	1,400	860	60	32	32	32	32	32	32	30	[a]	30	DP
Weeks per term	.....	.....	.....	.....	.....	18	16	18	14	18	10	22	20	12	7

DP—Diploma project or state examinations.
[a] none. During this term the student is assigned to field practice.

Source: *Source Z*, pp. 331–32.

SUPPLEMENT 1 TO TABLE IV–B–17.—*Additional Information on Curriculum*

I. *Optional Courses:*

1. Agronomy
2. Apiarian science
3. Fish hatcheries
4. Agricultural buildings
5. Methodology of propaganda and popularization work
6. Physical education
7. Agricultural law
8. Foreign language

II. *Specialization Courses and Electives:* unknown.

III. *Time Budget in Weeks:*

1. Instruction	123
2. Examination sessions	23
3. Practice assignments	48
4. Diploma and state examinations	7
5. Vacations	32
Total	238

IV. *Instruction Schedule:* see table above.

V. *Examination Schedule:*

1. Graded examinations	32
2. Qualifying tests	50
3. Graded course projects	10

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SUPPLEMENT 2 TO TABLE IV–B–17.—*4-year program of instruction in agronomy offered at Timiriazev Agricultural Academy in Moscow, 1945*

Subjects	Year of study	Total hours	Distribution in percent	Lectures	Practice and laboratory
I. Political	.....	356	8.6	218	138
Marxism-Leninism	1,2	218	.....	128	90
Political economy	3	138	.....	90	48
II. General scientific	.....	1,530	37.3	660	780
Physics	1	146	.....	64	82
Inorganic and analytical chemistry	1	206	.....	72	134
Organic chemistry	2	108	.....	72	36
Physical and colloidal chemistry	2	72	.....	36	36
Botany	1	178	.....	82	96
Zoology	1	72	.....	36	36
Animal physiology	1,2	110	.....	64	46
Plant physiology	2	108	.....	54	54
Microbiology	2	72	.....	36	36
Soil science and geology	2	180	.....	90	90
Geodetics (geodesy)	1	54	.....	18	36
Meteorology and climatology	2	54	.....	36	18
Foreign language	1,2	170	.....	.....	170
III. Specialized agriculture	.....	1,919	46.8	1,013	906
Introduction to agronomy	1	36	.....	18	18
General agriculture	3	144	.....	80	64
Agrochemistry	3	162	.....	57	105
Plant breeding	3,4	194	.....	102	92
Vegetable cultures	3	64	.....	40	24
Fruit cultures (horticulture)	4	56	.....	42	14
Pasture production	4	60	.....	30	30
Selection and seed production	4	129	.....	70	59
Entomology and phytopathology	3,4	141	.....	82	59
Nutrition and breeding of animals	3	126	.....	76	50
Zootechny	4	115	.....	70	45
Plant production	4	75	.....	45	30
Forestry	4	42	.....	28	14
Mechanization of agriculture	1,2,3	228	.....	112	116
Organization and business management	4	174	.....	88	86
Food storage and technology	4	75	.....	45	30
Agricultural statistics	4	56	.....	28	28
Bookkeeping	4	42	.....	.....	42
IV. Other (military training)	1–4	299	7.3	60	239
Total	.....	4,104	.....	1,951	2,153
Distribution	.....	.....	100.0	47.5	52.5

Source: E. Ashby, *Scientist in Russia*, p. 90. Curriculum refers to 1945–46 and is based on 4 years of training.

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TABLE IV–B–18.—*Veterinary medicine: 5-year program in veterinary institutes and departments, 1955 curriculum (Specialty 1507)*

Subjects of instruction	Hours total	Lecture	Laboratory	Seminar and practice session	Course projects	Hours per week per term									
						1	2	3	4	5	6	7	8	9	10
1. Foundations of Marxism-Leninism	250	160	.....	90	.....	3	3	4	3	....	....	....	....	....	....
2. Political economy	140	100	.....	40	.....	....	....	....	....	2	2	3	2	....	....
3. Foreign language	270	.....	.....	270	.....	2	2	2	2	....	....	....	....	....	....
4. Latin	60	.....	60	.....	.....	3	....	....	....	....	....	....	....	....	....
5. Physics	90	40	50	.....	.....	5	....	....	....	....	....	....	....	....	....
6. Inorganic and analytical chemistry	150	50	100	.....	.....	5	3	....	....	....	....	....	....	....	....
7. Organic chemistry with fundamentals of physical and colloidal chemistry and biochemistry	220	100	120	.....	.....	....	7	5	....	....	....	....	....	....	....
8. Agronomy and botany	140	70	60	10	.....	....	3	2	2	....	....	....	....	....	....
9. Zoology	90	50	40	.....	.....	5	....	....	....	....	....	....	....	....	....
10. Darwinism	40	40	.....	.....	.....	....	2	....	....	....	....	....	....	....	....
11. Anatomy of farm animals	300	100	200	.....	.....	7	5	4	....	....	....	....	....	....	....
12. Histology and embryology	160	60	100	.....	.....	....	5	3	....	....	....	....	....	....	....
13. Physiology of farm animals	200	90	110	.....	.....	....	....	6	5	....	....	....	....	....	....
41. General and specific animal breeding	220	120	90	10	.....	....	....	4	6	2	....	....	....	....	....
15. Animal feeding	160	70	80	.....	10	....	....	....	3	6	....	....	....	....	....
16. Microbiology	200	90	110	.....	.....	....	....	....	5	6	....	....	....	....	....
17. Zoological hygiene	130	60	60	.....	10	....	....	....	....	4	3	....	....	....	....
18. Pathological physiology	150	60	90	.....	.....	....	....	....	4	4	....	....	....	....	....
19. Pharmacology	190	80	100	10	.....	....	....	....	....	4	7	....	....	....	....
20. Clinical diagnostics, including X-ray analysis and prophylactic clinic	160	60	90	.....	10	....	....	....	....	4	5	....	....	....	....
21. Operative surgery, including topographic anatomy	130	50	70	.....	10	....	....	....	....	....	3	4	....	....	....
22. Pathological anatomy and autopsy, including clinical	220	90	110	10	10	....	....	....	....	....	5	4	....	....	4
23. Veterinary gynecology	180	60	110	.....	10	....	....	....	....	....	5	5	....	....	....
24. Pathology and therapy of inner noninfectious diseases with clinical work	280	120	150	.....	10	....	....	....	....	....	....	6	3	4	7
25. General and specific surgery, including ophthalmology and orthopedics with clinical work	260	110	140	.....	10	....	....	....	....	....	2	3	5	2	8
26. Parasitology	180	70	100	.....	10	....	....	....	....	....	....	....	5	8	....
27. Veterinary and sanitary analysis, including technology of animal products	180	70	100	.....	10	....	....	....	....	....	....	....	5	8	....
28. Epizootic diseases, with clinical work	280	120	150	.....	10	....	....	....	....	....	....	4	4	5	7
29. Economics of socialist agriculture	60	40	.....	20	.....	....	....	....	....	....	....	3	....	....	....
30. Organization of socialist agriculture enterprises	80	50	.....	20	10	....	....	....	....	....	....	....	3	3	....
32. Organization of veterinary services	40	30	.....	10	.....	....	....	....	....	....	....	....	....	....	4
31. Physical education	140	.....	.....	140	.....	2	2	2	2	....	....	....	....	....	....
Total	5,350	2,210	2,390	630	120	32	32	32	32	32	32	32	27	30	30
Weeks per term	.....	.....	.....	.....	.....	18	19	19	18	18	17	19	8	17	11

Source: *Source Z*, pp. 341–42.

SUPPLEMENT 1 TO TABLE IV–B–18.—*Additional Information on Curriculum*

I. *Optional Courses:*

1. Physical education
2. Bee diseases
3. Diseases of furry animals
4. Methodology of propaganda
5. History of veterinary medicine
6. Foreign language
7. Veterinary law

II. *Specialization Courses and Electives:* unknown.

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III. *Time Budget in Weeks:*

1. Instruction	164
2. Examinations	24
3. Practice assignments	26
4. State examinations	5
5. Vacations	32
Total	251

IV. *Instruction Schedule:* see table above.

V. *Examination Schedule:*

1. Graded examinations	36
2. Qualifying examinations	51
3. Graded course work	14

SUPPLEMENT 2 TO TABLE IV–B–18.—*4-year veterinary medicine program as of 1947*

Subject	Year of study	Instruction hours allocated	Distribution	
			Hours	Percent
I. Political	.....	.....	396	7.1
1. Principles of Marxism-Leninism	1,2	252	.....	.....
2. Political economy	3,4	144	.....	.....
II. General scientific	.....	.....	1,584	28.4
3. Inorganic and analytical chemistry	1	180	.....	.....
4. Organic and biochemistry	1,2	324	.....	.....
5. Physics	1	108	.....	.....
6. Botany	1,2	144	.....	.....
7. Zoology	1	90	.....	.....
8. Anatomy	1,2	306	.....	.....
9. Darwinism	1	72	.....	.....
10. Histology and embryology	1	162	.....	.....
11. Physiology	2	198	.....	.....
III. Specialized	.....	.....	3,604	64.5
a. Preclinical	.....	.....	1,098	19.7
12. Microbiology	3,4	198	.....	.....
13. Animal hygiene	3,4	162	.....	.....
14. Pathological anatomy	3,4	256	.....	.....
15. Pathological physiology	3,4	162	.....	.....
16. Pharmacology	3,4	120	.....	.....
17. Clinical diagnosis and roentgenology	3,4	200	.....	.....
b. Clinical	.....	.....	1,792	32.0
18. Clinical therapeutics (internal diseases)	3,4	322	.....	.....
19. General surgery	3,4	342	.....	.....
20. Operational surgery	3,4	180	.....	.....
21. Clinical epizootics	3,4	320	.....	.....
22. Parasitology	3,4	240	.....	.....
23. Obstetrics, gynecology and artificial insemination	3,4	204	.....	.....
24. Military veterinary medicine and hygiene	3,4	184	.....	.....
c. Animal breeding and administrative	.....	.....	714	12.8
25. Animal breeding	2,3	306	.....	.....
26. Animal feeding	2,3	90	.....	.....
27. Organization of socialist agriculture and collective farming	2,3	198	.....	.....
28. Economics of socialist agriculture	3,4	60	.....	.....
29. Legal veterinary medicine	3,4	60	.....	.....
Total	.....	5,584	5,584	100.0

Source: V. Koropov, *Veterinarnoe obrazovanie v SSSR* (Veterinary Education in the U.S.S.R.), Moscow, 1948. Reproduced in "Higher Education in the Soviet Union," unpublished manuscript in Russia, New York; Research Program on the U.S.S.R., pp. 178–9.

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TABLE IV–B–19.—*Medicine: Comparison of Soviet 6-year medical curricula, 1945 and 1955*

No. and course	Total hours		Distribution of hours			Terms
	1945	1955	Lectures	Laboratory	Seminars	
1. Philosophical Disciplines (principles of Marxism-Leninism)	250	250	160	.....	90	1–4
2. Latin and Foreign Language	298	220	.....	.....	220	1–4
3. Physical Culture	.....	166	16	16	134	1–4
4. Physics	144	136	68	40	28	1–2
5. Biology	216	190	86	104	.....	1–2
6. Anatomy of the Human Body	397	392	118	274	.....	1–3
7. Histology and Embryology	250	182	66	116	.....	2–3
8. Inorganic and Analytical Chemistry	162	140	54	86	.....	1–2
9. Biological Chemistry, including Organic and Colloidal	374	295	131	164	.....	2–4
10. Physiology	278	247	132	115	.....	2–4
11. Microbiology	255	207	70	137	.....	4–5
12. Political Economy	.....	90	60	30	.....	4–7
Military Medicine	180	.....	.....	.....	.....	.....
13. Pathological Physiology	162	155	68	87	.....	4–6
14. Pharmacology	219	170	68	102	.....	5–6
15. Pathological Anatomy	264	184	87	97	.....	5–6
16. Diagnosis of Internal Disease with Radiology	332	274	133	141	.....	5–6
17. General Surgery	213	189	87	102	.....	5–6
18. Operational surgery, including Topographical Anatomy	127	117	33	84	.....	5–7
19. Hygiene	254	162	81	81	.....	5–7
20. History of Medicine and Organization of Health	119	125	51	.....	74	8–9
21. Clinical Therapy, including course on tuberculosis	276	253	111	142	.....	7–8
22. Clinical Surgery and a course of Neurology	246	200	98	102	.....	7–8
23. Neuropathology	138	106	44	62	.....	8–9
24. Skin and Venereal Disease	124	101	44	57	.....	8–9
25. Obstetrics and Gynecology	279	379	83	96	200 H	7–12
26. Otorhinolaryngology	96	88	31	57	.....	8–9
27. Pediatrics	212	166	66	100	.....	9–10
28. Ophthalmology	96	80	32	48	.....	10
29. Psychiatry	100	90	36	54	.....	9
30. Forensic Medicine	100	100	34	66	.....	9–10
31. Hospital Therapy with the Polyclinics	304	486	68	68	350 H	9–12
32. Infectious Diseases and Epidemiology	184	214	32	32	150 H	10–12
33. Hospital Surgery, Traumatology, and Stomatology	332	544	102	102	340 H	9–12
Total hours	6,981	6,698	2,350	2,762	1,586	.....

H=Hours spent in hospital during sixth year.

Source: A. Starr, "Medical Education in Soviet Russia," *The Journal of Medical Education*, Vol. 33, No. 12 (December 1958), 831.

For 1945 curriculum, see Ashby, *Scientist in Russia*, pp. 88–9; and *SPM*, p. 323.

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SUPPLEMENT 1 TO TABLE IV–B–19.—*A comparison of medical curricula in the Soviet Union and in three American medical schools as of the mid-1950's*

Subjects of instruction	Distribution of hours			
	Soviet	*Columbia*	*Washington*	*Harvard*
Anatomy	574	595	618	487
Biochemistry	295	181	312	220
Physiology	247	226	306	220
Microbiology	207	192	264	169
Pharmacology	170	137	216	146
Pathology	339	498	504	331
Medicine	1,227	1,050	980	798
Surgery	1,050	722	804	660
Pediatrics	166	348	327	216
Psychiatry	90	182	143	248
Neurology	106	88	53	39
Public health	387	139	84	165
Obstetrics and gynecology	379	336	387	309
Medical specialties	269	144	78	109
Dermatology	101	62	18	37
ENT	88	40	30	40
Ophthalmology	80	42	30	32
Electives	.....	665	198	144
Total	5,506	5,503	5,274	4,261

Source: A Starr, "Medical Education in Soviet Russia," 852.

SUPPLEMENT 2 TO TABLE IV–B–19.—*A historical comparison of medical curricula in Soviet and American medical schools*

Subjects of instruction	Hours of instruction					
	Soviet			Duke, 1942	Harvard, 1940	Columbia, 1943
	1930	1936	1942			
Premedical sciences	588	822	648	.....	.....	.....
Medical sciences	3,448	4,808	4,494	4,529	3,877	4,456
Anatomy and histology	378	631	576	550	440	662
Physiologic sciences	456	695	612	550	593	519
Pathology and bacteriology	492	650	588	641	479	571
Medicine, surgery and specialties	1,342	2,072	2,081	1,970	1,719	2,115
Pediatrics	162	180	185	191	212	213
Obstetrics and gynecology	216	255	182	468	317	288
Hygiene and sanitation	342	325	270	59	124	88
Other subjects:						
Language	120	353	306	.....	.....	.....
Philosophy and economics	380	153	216	.....	.....	.....
Medico-military science and tactics	864	174	420	.....	.....	.....

Source: Michael B. Shimkin, "Medical Education in the Soviet Union," in *American Review of Soviet Medicine, 1943–44*, vol. 1, No. 1, American-Soviet Medical Society, p. 474.

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TABLE IV–B–20.—*Pedagogy, teacher of physics and fundamentals of production: 5-year program in pedagogical institutes as of 1957 (Specialty 21YZ)*

Subject	Hours per week per term										Number of hours			
	1 (19 weeks)	2 (16 weeks)	3 (19 weeks)	4 (16 weeks)	5 (19 weeks)	6 (13 weeks)	7 (13 weeks)	8 (16 weeks)	9 (18 weeks)	10 (18 weeks)	Total	Lecture	Laboratory	Practical work or seminar
1. History of the C.P.S.U.	3	4	3	4	.....	.....	.....	.....	.....	.....	224	120	104	.....
2. Political economy	.....	.....	.....	.....	2	3	2	3	.....	.....	140	98	42	.....
3. Dialectical and historical materialism	.....	.....	.....	.....	.....	.....	2	3	4	4	140	80	60	.....
4. Psychology	2	3	.....	.....	.....	.....	.....	.....	.....	.....	84	50	34	.....
5. School hygiene	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	36	18	18	.....
6. Pedagogy	.....	.....	3	4	.....	.....	.....	.....	.....	.....	120	70	50	.....
7. History of pedagogy	.....	.....	.....	.....	2	3	.....	.....	.....	.....	72	54	18	.....
8. Foreign language	2	2	2	2	.....	.....	.....	.....	.....	.....	140	.....	140	.....
9. Physical education	2	2	2	2	.....	.....	.....	.....	.....	.....	140	.....	140	.....
10. Analytic geometry	5	4	.....	.....	.....	.....	.....	.....	.....	.....	158	88	70	.....
11. Mathematical analysis	7	5	7	4	.....	.....	.....	.....	.....	.....	410	232	178	.....
12. Methods of mathematical physics	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	76	56	20	.....
13. Mechanical drawing	3	2	.....	.....	.....	.....	.....	.....	.....	.....	86	18	.....	68
14. General physics	.....	9	9	9	9	.....	.....	.....	.....	.....	636	272	160	204
15. Theoretical physics	.....	.....	.....	.....	.....	5	6	6	6	6	334	218	116	.....
16. Theoretical mechanics	.....	.....	.....	.....	4	4	.....	.....	.....	.....	128	64	64	.....
17. Special practical training in physics	.....	.....	.....	.....	.....	.....	.....	4	4	4	136	.....	.....	136
18. Special course in physics (elective)	.....	.....	.....	.....	.....	.....	.....	.....	3	3	54	54	.....	.....
19. Astronomy with methods of teaching	.....	.....	.....	.....	6	4	.....	.....	.....	.....	160	100	.....	60
20. Methods of teaching physics	.....	.....	.....	.....	.....	6	5	2	2	2	210	60	50	100
21. Methods of teaching courses on the bases of production	.....	.....	.....	.....	.....	.....	1	2	1	1	70	12	26	32
22. Educational movies	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	48	.....	.....	48
23. Technology of metals and materials with practical training in school shops	5	2	6	4	.....	.....	.....	.....	.....	.....	310	56	6	248
24. Technical mechanics	.....	.....	.....	.....	.....	.....	3	3	.....	.....	86	48	6	32
25. Machine technology with practical training in auto-tractor technology	.....	.....	.....	.....	.....	.....	5	4	4	4	490	54	6	130
26. Electrical engineering	.....	.....	.....	.....	3	4	.....	.....	.....	.....	114	38	6	70
27. Radio engineering	.....	.....	.....	.....	.....	.....	6	3	.....	.....	120	44	6	70
28. Pedagogical practice in extra-curricular activities	.....	.....	.....	.....	2	2	.....	.....	.....	.....	60	.....	60	.....
29. Special training	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	48	.....	48	.....
Total hours	32	33	32	32	32	32	30	30	24	24	4,530	1,904	1,428	1,198

Source: MVO SSSR, *Uchebnye plany pedagogicheskikh institutov* (Study Plans of Pedagogical Institutes), Moscow, 1957, as reproduced in W. K. Medlin, C. B. Lindquist, and M. L. Schmitt, *Soviet Education Programs*, Washington, D.C.: U.S. Dept. of Health, Education and Welfare, Bulletin 1960, No. 17, OE–14037, 1960, pp. 254–56.

SUPPLEMENT TO TABLE IV–B–20.—*Additional Information on Curriculum*

I. *Optional Courses:*

1. Practical training in extra-curricular and out-of-school activities
2. Improving driving skills (automobile or tractor)
3. Nuclear physics
4. Physics of semiconductors and dielectrics
5. Physics of electronic phenomena
6. Special course in optics
7. Hydrodynamics and aerodynamics
8. Geophysics
9. History of physics
10. Special topics in the methodology of physics
11. Selected chapters of general chemistry
12. Improving sports skills
13. Foreign language
14. Choral staging
15. Individual instruction in playing musical instruments

II. *Specialization Courses and Electives:* unknown

III. *Time Budget in Weeks:*

Includes 23 weeks of teaching practice from the 6th through 10th terms.

IV. *Instruction Schedule:* see table above.

V. *Examination Schedule:*

1. Graded examinations 31
2. Qualifying examinations 43
3. Graded course work 4

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TABLE IV–B–21A.—*Curriculum of Interregional Communist Party schools (MPSh) for party functionaries (in 4-year higher educational establishments of the Communist Party of the Soviet Union)*

Subjects	Instruction hours	Distribution in percent
I. *Political and general social science subjects*	1,330	41.5
1. History of the Communist Party of the U.S.S.R.	250	.....
2. Dialectical and historical materialism	200	.....
3. Political economy	300	.....
4. History of international workers' and national liberation movements	180	.....
5. History of the U.S.S.R.	150	.....
6. Party and government affairs and procedures	150	.....
7. Foundations of Soviet jurisprudence (civil, labor and collective farm law)	100	.....
II. *Economics and planning subjects*	480	15.0
8. Economic geography of the U.S.S.R. and foreign countries	100	.....
9. Economics, organization and planning in industry, construction and transport	200	.....
10. Economic organization and planning in agricultural enterprises	180	.....
III. *Applied-technical managerial subjects*	1,390	43.5
11. Power resources in industry	80	.....
12. Industrial technology (in major branches of industry)	270	.....
13. Industrial and civil construction	100	.....
14. General agriculture, plant cultivation and agrochemistry	240	.....
15. Animal breeding	140	.....
16. Mechanization and electrification of agriculture	160	.....
17. Regional planning of local industry and cultural services	80	.....
18. Trade, finance and banking	80	.....
19. Accounting and auditing techniques	60	.....
20. Statistics	80	.....
21. Mathematics	100	.....
Total	3,200	100.0
22. Industrial practice	2 months	.....
23. Optional electives, total	470	.....
a. Foreign language	200	.....
b. Russian language	150	.....
c. Automotive instruction (including driver education)	120	.....
Grand total	3,670	.....

Source: Malin, *op. cit.*, pp. 414–15.
NOTE.—This curriculum was adopted in 1956–57. Upon completion of the course, students take state graduation examinations in the history of the Communist Party of the Soviet Union, dialectical and historical materialism, political economy and national economy of the U.S.S.R.

TABLE IV–B–21B.—*Curriculum of Interregional Communist Party schools (MPSh) for newspaper workers (in 4-year higher educational establishments of the Communist Party of the Soviet Union)*

Subjects	Instruction hours	Distribution in percent
I. *Political and general social science subjects*	1,330	41.5
1. History of the Communist Party of the U.S.S.R.	250	.....
2. Dialectical and historical materialism	200	.....
3. Political economy	300	.....
4. History of international workers' and national liberation movements	180	.....
5. History of the U.S.S.R.	150	.....
6. Party and government affairs and procedures	150	.....
7. Foundations of Soviet jurisprudence (civil, labor and collective farm law)	100	.....
II. *Journalistic subjects*	840	26.3
8. Literature	200	.....
9. Russian language	130	.....
10. Style	90	.....
11. Journalism	320	.....
12. Economic geography of the U.S.S.R. and foreign countries	100	.....
III. *Applied-technical managerial subjects*	1,030	32.2
13. Economics of branches of production	350	.....
14. Fundamentals of industry and construction	300	.....
15. Fundamentals of agriculture, animal breeding and mechanization of agriculture	300	.....
16. Statistics	80	.....
Total	3,200	100.0
17. Practical assignment in newspaper work	2 months	.....
18. Optional electives, total	450	.....
a. Foreign language	200	.....
b. Photography	50	.....
c. Stenographic training	200	.....
Grand total	3,650	.....

Source: Malin, *op. cit.*, p. 415.
NOTE.—This curriculum was adopted in 1956–57. Upon completion of the course, students take state graduation examinations in the history of the Communist Party of the Soviet Union, dialectical and historical materialism, political economy and journalism.

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GENERAL NOTE TO APPENDIX TABLES IV–C–1, IV–C–2 AND IV–C–3

Appendix Tables IV–C–1, IV–C–2 and IV–C–3 present data on the number of Soviet higher educational establishments as compiled from different Soviet sources. The aggregate number of Soviet higher educational establishments (Table IV–C–1) officially reported in Soviet statistical handbooks is a mystery, for we can never exhaust the grand total by summing up the various distributions of institutions of higher learning by field or specialty group (see definitions in text). Apparently the *total* independent number of higher educational establishments reported includes, in addition to regular (day) institutions, extension-correspondence institutes and independent evening *branches* of higher educational establishments. But even when the number of all these establishments is included, the sum still does not exhaust the officially reported total. One can only speculate about the institutions contained in the residual figure. What is worse, in one year (1947) the number of institutions identifiable by branch from the Soviet directory of higher educational establishments (*Sprav VUZ-1947*) *exceeds* the official reported total by 15 units.

Until 1947 the Soviet Government did not publish directories of its higher educational establishments. Until then Soviet higher educational establishments, grouped by branch and specialty field, had to be compiled from various sources. These compilations are summarized in Table IV–C–2. The totals (Cols. TR and GT in Table IV–C–2) derived from the sub-groups invariably diverge from the Soviet official total reported in Table IV–C–1. Omissions, or double-counting in the case of branch divisions, as well as the opening and consolidation of individual establishments, make the task of matching the two compilations seem like looking for the proverbial needle in the haystack.

Since 1947 Soviet authorities have published regularly institutional directories (*Sprav VUZ . . .*), which identify each institution by location, street address, and list divisions and specialties offered therein. The 1959 directory was used as the basis for compiling Appendix IV–B–3, where Soviet data on divisions and specialties have been rearranged, recoded (in decimal code of the specialties and roman numeral —letter code for divisions) and checked (for 1959 and the two preceding years) for specialty offerings. The Soviet institutional directories for 1947, 1954, 1955, 1958 and 1959 have all been processed in order to arrive at the tabulation of data in Appendix Table IV–C–3. Table IV–C–3 thus presents a compilation of Soviet higher educational establishments by branch and specialty group on the basis of *individual* and *fully identifiable* units. The compilation in Table IV–C–3, in the opinion of this researcher, is the most reliable (we are absolutely sure what goes into the total and each sub-grouping) guide to the number and distribution of Soviet higher education institutions by branch and specialty group compiled so far. In each year listings include all the regular (day) higher educational establishments and all *independent* extension-correspondence institutes. The independent evening branches of regular higher educational establishments, plus the evening and extension-correspondence divisions of regular (day) institutions, are *not* included.

Finally, although on occasion speculation was made (because of the frequently encountered discrepancies) that Soviet official totals might include some higher educational establishments of the military establishment and of the Communist Party, this could not be verified. The compilation in Table IV–C–3 certainly excludes military academies (though military training "special divisions" of regular higher educational establishments and the enigmatic "Mechanical Institute" are automatically counted) and also excludes higher educational establishments of the Communist Party. The persistent search for institutions which are counted, and where, is exceedingly important, for it has direct relevance to Soviet reporting of enrollments and graduations by branch and specialty group, a reporting which is often based on institutional grouping. The implication of the institutional data in Table IV–C–3 is thus such that the reporting of professional graduates by Soviet higher educational establishments in all probability *excludes* persons trained in the military and party schools offering higher education certification.

TABLE IV–C–1.—*Official reporting of the total number of Soviet higher educational establishments, 1914, 1920–59*

Year end	Number of institutions	Year end	Number of institutions
1914(a).....	105	1940.....	817
1914(b).....	91	1941.....	.....
		1942.....	.....
1922.....	248	1943.....	.....
1923.....	187	1944.....	.....
1924.....	169	1945.....	789
1925.....	145	1946.....	805
1926.....	148	1947.....	807
1927.....	148	1948.....	823
1928.....	152	1949.....	864
1929.....	190		
		1950.....	880
1930.....	579	1951.....	887
1931.....	701	1952.....	827
1932.....	832	1953.....	818
1933.....	714	1954.....	798
1934.....	688	1955.....	765
1935.....	718	1956.....	767
1936.....	700	1957.....	763
1937.....	683	1958.....	766
1938.....	708	1959.....	753
1939.....	750		

1914(a) refers to present boundaries; 1914(b) to pre-1939 boundaries.

Sources and notes: *KS–1956*, pp. 202–03; *Dos–1957*, p. 278; *SSSR–Tsif–1958*, p. 356; *Eliutin–VSSS–1959*, p. 22; *NarKhoz–1960*, p. 740. Additional information about the number of institutions by branch of specialization may be found in Table C–1 of the initial study *SPM*, pp. 334–35. It must be noted that in general, the sums of the breakdowns and counts of *identified* institutions invariably total to a number smaller than the officially reported grand total.

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TABLE IV–C–2.—*Number of Soviet higher educational establishments, by field, for selected years, 1913–49*

Year end	Engineering			Agriculture	Socioeconomic	Educational				Health				Extension and Party			
	(a) ET	(b) EIC	(c) ETC	(d) A	(e) SE	(f) TED	(g) U	(h) TCO	(i) AR	(j) TH	(k) M	(l) PC	(m) TR	(n) ACP	(o) IEX	(p) EXB	(q) GT
1913	19	.....	.....	15	10	[45]	9	30	6	6	6	N	95	N	N	N	N
1919	27	.....	.....	14	6	.....	37	54	17	9	9	N	*166	N	N	N	N
1926	23	.....	.....	30	8	[65]	22	30	13	10	10	N	136	.....	.....	.....	.....
1927	25	.....	.....	30	6	[59]	20	27	12	.....	9	.....	129	.....	.....	.....	.....
1928	26	.....	.....	31	7	[54]	19	23	12	.....	11	.....	129	.....	.....	.....	.....
1929	32	.....	.....	38	11	[60]	20	27	13	.....	11	.....	152	.....	.....	.....	.....
1930	248	.....	.....	96	50	[105]	N	91	14	.....	38	.....	537	.....	.....	.....	.....
1931	[241]	199	42	125	(27)	154	19	.....	.....	45	.....	.....	[592]	53	.....	.....	645
1935	[150]	127	23	92	(23)	194	.....	.....	.....	55	.....	.....	[514]	99	.....	.....	613
1938	[165]	135	30	87	44	286	.....	.....	22	77	.....	.....	659	49	.....	.....	708
1939	[165]	137	28	85	47	375	22	(329)	24	78	.....	.....	750	.....	.....	.....	.....
1946	169	.....	.....	88	36	[406]	31	320	55	89	74	15	[788]	.....	16	372	[808]
1949	166	.....	.....	90	32	[462]	32	379	51	86	72	14	836	.....	16	410	853

[ ] By addition. ( ) Derived figure. * Does not total. N None.

Capital letters designate grouping of institutes by field

ET—Engineering total (EIC plus ETC).
EIC—Engineering, industry and construction.
ETC—Engineering, transportation and communication.
A—Agricultural.
SE—Socioeconomic.
TED—Total education (U, TCO, AR—residual is primarily pedagogical institutes).
U—Universities.
TCO—Pedagogical and teachers institutes, institutes of foreign languages.
AR—Arts.
TH—Total health.
M—Medical only.
PC—Physical culture only.
TR—Total regular higher educational establishments (ET, A, SE, TED, TH).
ACP—Industrial academies and Higher Communist Party schools.
IEX—Independent extension training higher educational establishments.
EXB—Extension training divisions attached to regular higher educational establishments.
GT—TR plus IEX.

SOURCES AND NOTES TO TABLE IV–C–2

Place in Table *Sources and Notes*

1913 a, d, e, g–k, m.—Medynskii—1952, p. 169.

1919 a, d, e, g–k, m.—Statisticheskii ezhegodnik, 1918–20, vol. 2, pp. 112–113, as quoted by Gorokhoff, *Materials*, pp. 35a–35d. Note that *m* does not total—2 institutions short.

1926, a, d–k, m.—Pedagogicheskaia Entsiklopediia, 1930, vol. 3, col. 263, as quoted in Gorokhoff, *Materials*, pp. 35a–35d.

1927 a, d, e, g–i, k.—Podgotovka, pp. 64–65, as quoted by Gorokhoff, *Materials*, pp. 35a–35d.

1928–30 a, d–i, k, m.—NarKhoz—1932, p. 513. Socioeconomic segment (1930e) is biased upward by inclusion of Kom VUZ and industrial academies.

1931 b–d, f, j, n, q.—Sots Stroi—1936, p. 573.

1931 e.—Sots Stroi—1936, p. 573. Since the number of Kom VUZ is given (53 institutions), socioeconomic segment institutions are derived as a residual (645 minus 53 minus sum of *a, d, f, j*).

1935 b–d, f, j, n.—Sots Stroi—1936, p. 573. *n.* includes 17 Kom VUZ, 20 industrial academies, and 62 VKSKhSh.

1935 q.—Kul't Stroi—1940, p. 101. The total (596 institutions) includes 17 Kom VUZ and some other than regular higher educational establishments. If double counting in *Sots Stroi—1936*, p. 573, is eliminated (i.e., VKSKhSh subtracted from total and industrial academies and Kom VUZ added), it gives about the same total as in the table—614 institutions.

1935 e.—Derived as a residual.

1938 b–f, i, j, m, n.—Sots Stroi—1933–38, p. 121.

1939 b–g, i, j, m.—BSE-SSSR–1948, col. 1233. *Kul't Stroi—1940*, p. 256.

1946 a, d, e, g–l.—Medynskii—1948, p. 73.

1946 m.—By addition. *VVSh*, No. 7, 1947, p. 2, reports the total as 792, which differs from the derived total by four institutions.

1946, o, p.—VVSh, No. 6, 1947, p. 34.

1949, a, d, e, g–m, o–q.—Medynskii—1952, p. 167; and *BSE*—2d, vol. 9, p. 515.

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TABLE IV–C–3.—*Soviet higher educational establishments, by type, branch and specialty group as of 1947, 1954, 1955, 1958, and 1959*

Type of institution by branch and specialty group	1947	1954	1955	1958	1959
I. *Engineering-industrial*	*179*	*177*	*174*	*188*	*191*
1. Polytechnical and industrial (multidivisional institutes for engineering training in a variety of fields)	21	24	25	29	32
2. Electrical and power engineering, electronics and technical (engineering) physics	4	8	8	8	8
3. Machinebuilding engineering	32	30	29	32	30
of which:					
a. General machinebuilding (mechanical and automotive)	18	16	16	19	17
b. Naval engineering (shipbuilding)	2	2	2	2	2
c. Aeronautical engineering	7	7	7	7	7
d. Printing machinery and precision mechanics	3	3	3	3	3
e. Motion picture industry and cinema engineering	2	2	1	1	1
4. Geology, mining, and metallurgy	21	26	26	27	28
of which:					
a. Geology, mining (all types except ores), coal mining, and petroleum engineering	10	15	15	15	16
b. Mining (ores) and metallurgy	11	11	11	12	12
5. Chemical engineering and chemical technology	11	9	9	10	11
6. Fish and food industry	12	13	13	13	13
of which:					
a. Food industry technology, machinery, and maintenance engineering	.....	9	9	9	9
b. Fish industry technology, fleet operations and maintenance engineering	.....	4	4	4	4
7. Light industry	9	8	8	8	8
of which:					
a. Textile industry engineering and technology	6	5	5	5	5
b. Other branches of light industry	3	3	3	3	3
8. Civil engineering, construction engineering and geodesy	32	27	27	29	30
of which:					
a. Civil engineering and other construction engineering (except roads)	19	17	} 19	20	21
b. Technology of construction materials and testing engineering	6	3			
c. Geodesy	2	2	2	2	2
d. Road building and related surface structures engineering	5	5	6	7	7
9. Meteorology and hydrology	2	2	2	2	2
10. Transportation and communications (maintenance, operation and construction engineering)	25	30	27	30	30
of which:					
a. Railroad	12	15	13	14	13
b. River transport	2	4	4	4	4
c. Sea transport	5	5	4	4	4
d. Air transport (civilian only)	1	1	1	1	1
e. Communications	5	5	5	7	7
II. *Agricultural*	100	109	108	109	109
11. Agriculture	56	61	63	67	67
12. Veterinary medicine, zootechny, animal breeding, and related studies	20	23	21	19	19
13. Mechanization and electrification of agriculture (partly engineering)	8	7	7	7	7
14. Soil conservation, water conservation and irrigation	5	6	6	5	5
15. Forestry and timber industry (latter is engineering)	11	12	11	11	11
III. *Socioeconomic*	40	35	31	30	28
16. Economic planning and managerial economics	9	9	8	7	6
17. Finance	9	9	9	9	8
18. Trade and distribution	8	5	5	7	7
19. Industrial and engineering economics	3	3	3	3	3
20. Jurisprudence	11	9	6	4	4

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TABLE IV–C–3.—Continued

Type of institution by branch and specialty group	1947	1954	1955	1958	1959
IV. *Education, including universities, arts and cultural services*	414	382	361	297	296
21. Universities	31	33	33	39	40
22. Pedagogical institutes	120	187	206	195	193
23. Teachers institutes	197	91	52	1	1
24. Institutes of foreign languages (and Moscow Institute of Far Eastern Affairs)	8	20	19	12	10
25. Institutes for librarians and archival specialists	3	5	5	3	5
26. Arts	55	46	46	47	47
of which:					
a. Architecture	3	3	3	3	3
b. Graphic and sculptural arts	13	9	9	9	9
c. Conservatories	22	21	21	22	22
d. Theatrical (stage and movie actors, producers, effects, etc.)	17	13	13	13	13
V. *Health and physical education*	89	88	88	94	95
27. Medicine	57	63	65	70	72
28. Stomatology	8	4	2	2	2
29. Pharmaceutical	9	8	8	7	6
30. Physical culture (teachers, coaches, and professional sportsmen)	15	13	13	15	15
Total (accounted for)	822	791	762	718	719

Sources and notes: The information in this table was compiled from: *Sprav VUZ–1947; Sprav VUZ–1954; Sprav VUZ–1955; Sprav VUZ–1958; Sprav VUZ–1959, passim.* The years refer to the respective academic years; i.e., 1947 refers to the academic year 1947–48. The actual count of institutions is made on the basis of listings of the Ministry of Higher Education, which it prepares in January of a given calendar year for the next academic year.

Among the institutions listed in this table there are included: 1947–15; 1954–23; 1955–22; 1958–22 *independent* (as contrasted with extension-correspondence divisions of regular higher educational institutions) extension-correspondence institutes. These institutes, being multi-branch establishments, operated in 1958 an estimated number of some 70 local (i.e., in different cities) branches. In addition, institutions *not included* in this list of professional training establishments are military academies (probably 18), commissioned officers' military schools (number unknown), police commissioned officers' schools and probably an academy (number unknown), industrial academies (probably 7) and 2 Communist Party higher educational establishments (1 Academy of Social Sciences and a Higher Party School, which probably has about 20 local branches).

It is to be noted furthermore that because there is a continuing process of consolidation and branching off among Soviet establishments of higher learning, the exact number of individual institutions cannot be ascertained precisely at any given time. And in this connection it is to be emphasized that the appearance or disappearance of individual establishments does not necessarily mean any change in the availability of physical facilities.

In 1959, among the total institutions listed, 21 were independent extension-correspondence institutions and 2 were independent branch extension-correspondence divisions of regular higher educational estbalishments located elsewhere (Kazan' Institute of Chemical Technology—branch in Kemerovo; and Moscow Petroleum Institute—branch in Al'met'evka).

TABLE IV–D–1.—*Teaching staffs in Soviet higher education, 1927–59*

Year end	Staff and plurality	Staff only	Among senior Staff: Professors	Among senior Staff: Associate professors
	(a)	(b)	(c)	(d)
1927	.....	16,454	.....	.....
1929	22,876	13,758	.....	.....
1931	58,220	26,200	.....	.....
1940	60,000	50,890	5,361	13,123
1943	.....	24,749	.....	.....
1944	51,904	42,072	4,669	10,125
1946	74,341	67,280	5,370	13,386
1947	81,500	.....	.....	.....
1950	87,000	80,000	.....	.....
1953	105,400	.....	.....	.....
1954	114,200	86,000	.....	.....
1955	119,059	.....	6,129	25,080
1956	125,000	.....	.....	.....
1957	132,300	.....	.....	.....
1958	135,700	.....	.....	.....
1959	137,800	.....	.....	.....

SOURCES AND NOTES

Place in table — *Sources and discussion*

1927b.—Sinetskii, *PP Kadry*, p. 61.
1929a, b.—Ibid., pp. 66, 104; also *NarKhoz–1932*, p. 540.
1931a.—Sinetskii, *PP Kadry*, p. 79.
1940a.—Ibid., p. 93.
1931, 1940,, 1942, 1944, 1946b.—Ibid., p. 104.
1946a, b, c, d.—Ibid., p. 105; *VVSh*, No. 11, 1947, p. 30.
1940c, d.—VVSh, Nos. 5–6, 1946, p. 2.
1946a, b, c, d.—Ibid., p. 105; *VVSh*, No. 11, 1947, p. 30.
1950a.—Ibid., No. 4, 1951, p. 11, states that professorial staffs, including *sovmestiteli*, increased between 1940 and 1950 by 45 percent. Assuming 60,000 for 1940, we have 87,000 for 1950 (year end).
1950b.—Bol'shevik, No. 20, 1950, p. 24; *KS–1956*, p. 248, reports this figure as 86,500.
1954b.—VVSh, No. 3, 1955, p. 3.
1955a, c, d.—KS–1956, p. 249.
1947, 1950, 1953–59a.—KS–1956, p. 248; *NKh–1956*, p. 233; *Dos–1957* p. 284; *NKh–1957*, pp. 257–58; *SSSR–Tsif–1958*, p. 563; *NarKhoz–1959*, p. 843; *NarKhoz–1960*, p. 754.
NOTE.—For the years 1947, 1950, 1953–59, see also Appendix Table V–B–2.

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Appendix to Chapter V

TABLE V–A–1.–Enrollment, Acceptances and Completion of Aspirantura (Advanced Degree) Training, 1929–59

TABLE V–A–2.–Distribution of Aspirantura Enrollment by Field of Study in the Fall of Selected Years, 1951–59

SUPPLEMENT TO TABLE V–A–2.– (Distribution by Branch of Institution of Aspirantura Students Enrolled in Higher Educational Establishments of the U.S.S.R. for Selected Years, 1934–46)

TABLE V–A–3.–Number of Advanced Degrees of Candidate and Doctor Awarded in All Fields in the U.S.S.R., 1934–59

SUPPLEMENT 1 TO TABLE V–A–3.– (Award of Candidate Degrees, 1946–53, Total and by Sex)

SUPPLEMENT 2 TO TABLE V–A–3.– (Estimated Attrition Rates among Advanced Degree Holders of Candidate and Doctor, 1954–57)

TABLE V–A–4.–Number and Distribution by Field of Candidate Degrees Awarded in the U.S.S.R., 1937–55; Employment of Candidate Degree Holders as of October 1, 1955, and Estimated Losses

TABLE V–A–5.–Number and Distribution by Field of Doctor Degrees Awarded in the U.S.S.R., 1937–55; and Employment of Doctor Degree Holders as of October 1, 1955, and Estimated Losses

TABLE V–B–1.–Number of Research, Academic and Advanced Degree Personnel in Soviet Higher Educational and Research Establishments, 1914–60

TABLE V–B–2.–Summary Data on the Composition of Soviet Research and Academic Personnel (*RAP*) for Selected Postwar Years

TABLE V–B–3.–Distribution of *RAP* Total, with Doctor's Degrees and with Candidate's Degrees by Field of Knowledge as of October 1, 1955

TABLE V–B–4.–Distribution of *RAP* Total, with Doctor's Degrees and with Candidate's Degrees by Field of Knowledge as of October 1, 1958

TABLE V–B–5.–Distribution of *RAP* Total, with Doctor's Degrees and with Candidate's Degrees by Field of Knowledge as of October 1, 1959

TABLE V–B–6.–National Composition of Research and Academic Personnel (*RAP*) in the U.S.S.R. for Selected Years, 1939–59

APPENDIX V–C–1.–Soviet Higher Educational and Research Establishments Which Offer Advanced Degree Training

Part I. List of Soviet Higher Educational Establishments and Scientific Research Institutes Accepting Candidate Degree Dissertations Only as of August 1956

Part II. List of Soviet Higher Educational Establishments and Scientific Research Institutes Accepting Both Candidate and Doctor Degree Dissertations as of August 1956

TABLE V–D–1.–Number of Research Establishments in the U.S.S.R. in Selected Years, 1914–60

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TABLE V–A–1.—*Enrollment, acceptances and completion*

[Enrollment figures in thousands]

		1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
I. *Enrollment* (year end):													
1. All institutions: higher education and research establishments	T	3.0	12.7	.....	14.8	13.0	10.6	9.8	9.0	8.3	12.2	.....	16.9
	R	3.0	12.7	.....	14.8	13.0	10.6	9.8	9.0	8.3	12.2	.....	14.4
	E	(a)	(a)	.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.....	2.5
2. Higher education	T	2.0	10.3	7.4	8.4	7.0	6.3	6.4	6.1	5.8	9.2	.....	13.2
	R	2.0	10.3	.....	8.4	7.0	6.3	6.4	6.1	5.8	9.2	.....	11.5
	E	(a)	(a)	.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.....	1.7
3. Research establishments	T	1.0	2.4	.....	6.4	6.0	4.3	3.4	2.9	2.5	3.0	.....	3.7
	R	1.0	2.4	.....	6.4	6.0	4.3	3.4	2.9	2.5	3.0	.....	2.9
	E	(a)	(a)	.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.....	0.8
II. *Acceptances* (calendar year):													
4. All institutions: higher education and research establishments	T	.....	.....	.....	.....	3,712	.....	.....	.....	.....	.....	.....	3,530
	R	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,782
	E	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	748
5. Higher education	T	.....	.....	.....	.....	2,098	.....	.....	.....	.....	.....	.....	2,768
	R	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,223
	E	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	545
6. Research establishments	T	.....	.....	.....	.....	1,614	.....	.....	.....	.....	.....	.....	762
	R	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	559
	E	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	203
III. *Completion* (calendar year):													
7. All institutions: higher education and research establishments	T	.....	.....	.....	.....	2,350	2,169	.....	.....	.....	.....	.....	1,978
	R	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,865
	E	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	113
8. Higher education	T	.....	.....	.....	.....	974	.....	.....	.....	.....	.....	.....	1,472
	R	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,411
	E	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	61
9. Research establishments	T	.....	.....	.....	.....	1,376	.....	.....	.....	.....	.....	.....	506
	R	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	454
	E	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	52

[a] None.

T—Total. R—Regular. E—Extension-correspondence.

SOURCES AND NOTES TO TABLE V–A–1

Enrollment is reported at the end of the calendar year. Acceptances and completion of aspirantura training refer to those during the course of the calendar year.

NOTE.—Aspirantura training, which was established in 1925, accounted in 1926 for about 800 advanced students (Sinetskii, *PP Kadry*, p. 58).

2,3T and 2–3RE (29,32–38).—Kul't Stroi–1940, p. 242. There was a negligible number of extension program aspirantura students. Consequently *R* is assumed to be the same as *T*.

4–9T (33).—Kul't Stroi–1934, p. 66.

7T (34).—Kul't Stroi–1935, pp. 96–97.

1–3T (29, 30, 32–38, 40, 45–55).—KS–1956, p. 255. It should be noted that this source reports aspirantura enrollment "as of the beginning" of the calendar year. Consequently, all figures were shifted accordingly to represent year-end

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of aspirantura (advanced degree) training, 1929–59

acceptance and completion figures in units]

1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
12.0	.....	.....	.....	9.8	14.7	15.8	17.3	19.4	21.9	24.8	26.7	29.1	30.8	29.4	25.5	22.2	23.1	28.6
....	.....	.....	.....	8.7	.....	.....	.....	.....	18.1	.....	.....	.....	.....	21.4	17.8	14.7	15.5	18.6
....	.....	.....	.....	1.1	.....	.....	.....	.....	3.8	.....	.....	.....	.....	8.0	7.7	7.5	7.5	10.0
....	.....	2.8	3.7	6.9	9.6	9.6	10.0	10.7	12.5	14.6	15.7	17.2	18.0	16.8	14.1	12.1	12.3	15.6
....	.....	.....	.....	6.1	.....	.....	.....	.....	11.2	.....	.....	.....	.....	13.2	10.6	8.8	9.0	10.8
....	.....	.....	.....	0.8	.....	.....	.....	.....	1.3	.....	.....	.....	.....	3.6	3.5	3.3	3.3	4.8
....	.....	.....	.....	2.9	5.1	6.2	7.3	8.7	9.4	10.2	11.0	11.9	12.8	12.6	11.4	10.2	10.8	13.0
....	.....	.....	.....	2.6	.....	.....	.....	.....	6.9	.....	.....	.....	.....	8.2	7.2	6.0	6.5	7.9
....	.....	.....	.....	0.3	.....	.....	.....	.....	2.5	.....	.....	.....	.....	4.4	4.2	4.2	4.3	5.1
....	.....	.....	.....	.....	.....	.....	.....	.....	7,717	.....	.....	.....	.....	7,367	5,732	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	6,377	.....	.....	.....	.....	5,384	4,123	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	1,340	.....	.....	.....	.....	1,983	1,609	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	4,783	.....	.....	.....	.....	4,193	3,231	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	4,253	.....	.....	.....	.....	3,225	2,464	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	530	.....	.....	.....	.....	968	767	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	2,934	.....	.....	.....	.....	3,174	2,501	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	2,124	.....	.....	.....	.....	2,159	1,659	.....	.....	.....
....	.....	.....	.....	.....	.....	.....	.....	.....	810	.....	.....	.....	.....	1,015	842	.....	.....	.....
....	.....	.....	.....	1,366	1,616	2,730	3,328	4,582	4,093	4,895	5,682	6,495	6,796	7,607	8,453	8,250	6,802	5,603
....	.....	.....	.....	1,221	1,443	2,531	3,057	4,174	3,649	4,524	5,115	5,843	5,997	6,536	7,213	6,811	5,272	4,089
....	.....	.....	.....	145	173	199	271	354	444	371	567	652	799	1,071	1,240	1,439	1,630	1,514
....	.....	.....	.....	1,200	1,164	2,045	2,232	2,918	2,461	2,977	3,412	4,009	4,349	4,752	5,301	4,941	3,826	3,330
....	.....	.....	.....	1,092	1,080	1,910	2,086	2,730	2,281	2,880	3,216	3,769	4,000	4,263	4,805	4,288	3,119	2,585
....	.....	.....	.....	108	84	135	146	188	180	97	196	240	349	489	496	653	707	745
....	.....	.....	.....	166	452	685	1,096	1,610	1,632	1,918	2,270	2,486	2,447	2,855	3,152	3,309	2,976	2,273
....	.....	.....	.....	129	363	621	971	1,444	1,368	1,644	1,899	2,074	1,997	2,273	2,408	2,523	2,053	1,504
....	.....	.....	.....	37	89	64	125	166	264	274	371	412	450	582	744	786	923	769

entries. For 1940, 1945, 1950, figures check with those reported in *Dos–1957*, p. 287, as of the "end of the year."

2T (31, 43, 44).—Sinetskii, *PP Kadry*, p. 177 (Chart 14). This source reports also figures for 1932–38, 1940, 1945–46 the same as those in the table.

1–3T (40).—*Dos–1957*, p. 287; *NKh–1957*, p. 260; and also Sinetskii, *PP Kadry*, p. 177; *VVSh*, No. 10, 1946, p. 48.

1–3T (45,50,56).—*Dos–1957*, p. 287; *NKh–1957*, p. 260.

1–3R (40,45,50,55).—*KS–1956*, p. 255.

1–3E (40,45,50,55).—Derived as a difference.

4–6TRE (40,50,55,56).—*NKh–1957*, p. 260.

1T (41).—*BSE–SSSR*, col. 1241.

7–9TRE (40,45,50,56).—*Dos–1957*, p. 287; *NKh–1957*, p. 260.

7–9TRE (40,45–55).—*KS–1956*, p. 258. For 1940, 1945, 1950, the data are identical with those presented in *Dos–1957*, p. 287 and *NKh–1957*, p. 260.

1–3T,7–9TRE (55–58).—*NarKhoz–1959*, p. 848.

1–3,7–9TRE (56–59).—*NarKhoz–1960*, p. 760.

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TABLE V–A–2.—*Distribution of aspirantura enrollment by field of study in the fall of selected years, 1951–59*
[Absolute numbers and percents]

Field of study	1951 total		1955 total		1955 Higher education establishments		1955 Research establishments		1958 total		1959 total	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Physical Sciences	8,603	39.2	14,791	50.4	7,532	45.0	7,259	57.6	13,584	58.8	16,683	58.3
Engineering	5,809	26.5	9,358	31.9	4,562	27.3	4,796	38.1	8,890	38.5	10,704	37.4
Physical-Mathematical	972	4.4	2,855	9.7	1,983	11.8	872	6.9	2,704	11.7	3,240	11.3
Chemistry	1,319	6.0	1,318	4.5	483	2.9	835	6.6	1,186	5.1	1,681	5.9
Geology-Mineralogy	503	2.3	1,260	4.3	504	3.0	756	6.0	804	3.5	1,058	3.7
Biological Sciences	4,798	21.8	6,154	20.9	3,117	18.6	3,037	24.1	4,529	19.6	5,637	19.6
Biology	1,247	5.7	1,426	4.8	583	3.5	843	6.7	1,053	4.6	1,380	4.8
Agricultural and veterinarian	2,165	9.8	2,564	8.7	910	5.4	1,654	13.1	1,633	7.1	2,125	7.4
Medical and pharmaceutical	1,386	6.3	2,164	7.4	1,624	9.7	540	4.3	1,843	7.9	2,132	7.4
Arts, Education, Humanities and Social Sciences	8,504	39.0	8,417	28.7	6,125	36.4	2,292	18.3	4,971	21.6	6,324	22.1
Philology	1,980	9.0	2,164	7.4	1,736	10.3	428	3.4	1,081	4.7	1,142	4.0
History and philosophy	2,607	12.0	2,064	7.0	1,432	8.5	632	5.0	1,013	4.4	1,253	4.4
Pedagogy	862	4.0	2,037	3.5	765	4.6	272	2.2	440	1.9	721	2.5
Economics and planning	1,366	6.2	1,810	6.2	1,295	7.7	515	4.1	1,584	6.9	2,160	7.5
Art and art history[a]	459	2.1	430	1.5	333	2.0	97	0.8	358	1.6	418	1.5
Architecture	154	0.7	186	0.6	78	0.5	108	0.9	84	0.4	109	0.4
Geography	328	1.6	359	1.2	212	1.3	147	1.2	217	0.9	267	0.9
Jurisprudence	748	3.4	367	1.3	274	1.5	93	0.7	194	0.8	254	0.9
Total	21,905	100.0	29,362	100.0	16,774	100.0	12,588	100.0	23,084	100.0	28,644	100.0
Percent	.....	.....	100.0	.....	57.1	.....	42.9	.....	.....	.....	.....	.....

Sources and Notes: *KS–1956*, pp. 256–57; *NarKhoz–1959*, p. 849; *Nar Khoz–1960*, p. 760.
[a] "Art," as defined in Russian terminology, covers fine arts, printing, sculpture; music; the theater, cinema and related fields.

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SUPPLEMENT TO TABLE V–A–2.—*Distribution by branch of institution of* aspirantura *students enrolled in higher educational establishments of the U.S.S.R. for selected years, 1934–46*

[In percent]

In addition to the distribution of aspirantura enrollment by field of study summarized in Table V–A–2, prior to the late 1940's Soviet authorities commonly reported distribution of *aspirantura* students enrolled in higher educational establishments of the U.S.S.R. by branch. These data are as follows:

Branch of study	Distribution in percent							
	(a) 1934	(c) 1939	(d) 1940	(e) 1944	(f) 1945	(g) 1946	1934–46 unweighted average	1934–46 assumed distribution
Engineering total	32.8	37.2	32.7	44.4	44.9	38.6	38.4	39.0
of which—								
Industry and construction	26.0	30.0	27.4	38.8	38.0	33.4	.....	.....
Transportation and communication	6.8	7.2	5.3	5.6	6.9	5.2	.....	.....
Agricultural	10.2	9.3	7.2	7.6	6.1	8.9	7.1	7.0
Socioeconomic	7.1	7.2	6.8	4.4	4.9	10.5	5.5	6.0
Educational total	37.2	27.9	37.1	37.6	37.1	35.7	34.1	35.0
of which Arts	.....	2.9	2.3	4.5	3.1	4.6	.....	.....
Medical	12.7	18.4	15.9	6.0	7.0	11.7	12.9	13.0
Subtotal							98.0	100.0
Discrepancy							2.0	
Total							100.0	
Total enrollment	6,259	9,172	13,200	(1)	(1)	9,600	.....	.....

[1] Unspecified.

(a) 1934—Distribution computed for VUZ aspirantura enrollment as of Jan. 1, 1934, Sinetskii, *PP Kadry,* p. 83.

(c) 1939—Distribution computed for VUZ aspirantura enrollment as of Jan. 1, 1939. Data from Sinetskii, *PP Kadry,* p. 90.

(d) 1940—Distribution computed for VUZ aspirantura enrollment as of Jan. 1, 1940. Data from Sinetskii, *PP Kadry,* p. 176.

(e) 1944, (f) 1945—Distribution given in *VVSh,* No. 10, 1946, p. 48.

(g) 1946—Distribution computed for VUZ aspirantura enrollment as of Jan. 1, 1946. Data from Sinetskii, *PP Kadry,* p. 176.

1934–46.—Unweighted average enrollment for 1934–46. Assumed distribution derived by adjusting discrepancy.

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TABLE V–A–3.—*Numbers of advanced degrees of candidate and doctor awarded in all fields in the U.S.S.R., 1934–59*

Calendar year and period	(A) Candidate degrees		(B) Doctor degrees	
	Number	Percent	Number	Percent
1934	.....	.....	(112)	.....
1935	.....	.....	(106)	.....
1936	.....	.....	(124)	.....
1934–36:				
Accounted total	(856)	(••)	(342)	(••)
Reported total	.....	(••)	.....	(••)
1937	2,099	.....	391	.....
1938	2,328	.....	607	.....
1939	3,839	.....	727	.....
1940	4,287	.....	978	.....
1937–40:				
Accounted total	12,553	(••)	2,703	(••)
Reported total	12,553	14.2	2,703	25.3
Annual average	3,138	.....	676	.....
1941	3,013	.....	663	.....
1942	1,195	.....	266	.....
1943	1,425	.....	511	.....
1944	2,203	.....	509	.....
1945	1,952	.....	431	.....
1941–45:				
Accounted total	9,788	(••)	2,380	.....
Reported total	9,736	11.0	2,380	22.3
Annual average	1,947	.....	476	.....
1946	3,188	.....	469	.....
1947	(3,500)	.....	621	.....
1948	c. 4,000	.....	557	.....
1949	(7,530)	.....	566	.....
1950	4,536	.....	492	.....
1946–50:				
Accounted total	.....	(••)	2,705	.....
Reported total	22,754	25.6	2,705	25.3
Annual average	4,550	.....	541	.....
1951	5,465	.....	529	.....
1952	c. 5,000	.....	475	.....
1953	8,530	.....	569	.....
1954	(12,842)	.....	663	.....
1955	11,800	.....	621	.....
1951–55:				
Accounted total	.....	(••)	2,857	(••)
Reported total	43,636	49.2	2,886	27.1
Annual average	8,727	.....	577	.....
1937–55:				
Accounted total	.....	(••)	.....	(••)
Reported total	88,679	100.0	10,671	100.0
Annual average	4,667	.....	562	.....
1956	7,800	.....	539	.....
1957	3,500	.....	(385)	.....
1958	(5,000)	.....	(490)	.....
1959	(5,700)	.....	(500)	.....
1956–59:				
Accounted total	(22,000)	.....	(1,914)	.....
Annual average	(5,500)	.....	(478)	.....
1937–59:				
Accounted total	(110,679)	.....	(12,585)	.....
Annual average	(4,812)	.....	(543)	.....

( )—estimates na—not applicable

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SOURCES AND NOTES TO TABLE V–A–3

Place in table — *Sources and discussion*

1934–36A.—Accounted total—estimated on the basis of the distribution in Sinetskii, *PP Kadry*, p. 160 (Chart 13, i.e., 3.3 percent for the period 1934–36).

1937–45A.—*VVSh*, No. 10, 1946, p. 47. As a further check, the percentage distribution reported in Sinetskii, *PP Kadry*, p. 160, was used also to reconstruct the figures for 1937–45. These estimates turned out to be good approximations of the actual annual figures included in this table.

1946A.—*Izvestia*, Aug. 14, 1954; *Bol'shevik*, No. 10, 1952, p. 2.

1948A.—*Izvestia*, Jan. 11, 1949.

1950A.—*VVSh*, No. 6, 1951, p. 24.

1951A.—*Bol'shevik*, No. 10, 1952, p. 2.

1952A.—*VVSh*, No. 7, 1953, p. 24. This source states that this year (i.e., 1952) about 5,000 candidate degrees were awarded.

1953A.—*Izvestia*, Aug. 14, 1954.

1955–57A.—*Uchitel'skaia gazeta*, May 16, 1958 (Eliutin speech).

1937–40, 41–45, 46–50, 51–55A.—Reported totals—Galkin, *Nau Kadry*, p. 156.

1947A.—Estimated as 3,500 by interpolation between 1946 and 1948.

1949A.—Estimated as 7,530 by deriving it as a residual from 1946–50 total minus the sum of years 1946, 1947, 1948 and 1950.

1954A.—Estimated as 12,842 by deriving it as a residual from 1951–55 total minus the sum of years 1951, 1952, 1953 and 1955.

1958A.—Estimate of 5,000 derived as follows: Net increment in the number of candidate degree holders in 1958 was 2,800 (*NarKhoz–1959*, p. 843). Assuming the annual attrition rate of 2.5 percent (see Supplement to Table V–A–3) and applying it to the 1957 base, we obtain the number of losses as 2,200, for a total estimate of degrees awarded (increment plus losses) of 5,000.

1959A.—Estimate of 5,700 derived as follows: Net increment in the number of candidate degree holders in 1959 was 3,400 (Appendix Table V–B–2; *Pravda*, Jan. 22, 1960). Assuming the annual attrition rate of 2.5 percent (see Supplement to Table V–A–3) and applying it to the 1958 base, we obtain the number of losses as 2,300, for a total estimate of degrees awarded (increment plus losses) of 5,700.

1934–36B.—Figures derived on the basis of the distribution presented in Sinetskii, *PP Kadry*, p. 149 (chart 7).

1937–45B.—*VVSh*, No. 10, 1946, p. 47. As a further check the percentage distribution reported in Sinetskii, *PP Kadry*, p. 149, was also used to derive estimates for 1937–45. These estimates were good approximations of the actual figures now appearing in the table.

1946–56B.—Galkin, *Nau Kadry*, p. 161. For several years the figures reported in this source check identically as follows: 1946—469; 1953—569, from *Izvestia*, Aug. 14, 1954 (for 1946, see also *Bol'shevik*, No. 10, 1952, p. 9). 1951—529, from *Bol'shevik*, No. 10, 1952, p. 9. For some other years there is a set of different figures, which are found in primary sources, and which were reproduced in *SPM*, p. 340, as follows:

Year	*Figures reported in Galkin*	*Alternate figures and their source*
1947	621	484 *VVSh*, No. 9, 1948, p. 27
1948	557	648 *VVSh*, No. 9, 1948, p. 27
1949	566	428 *VVSh*, No. 7, 1949, p. 11
1950	492	484 *VVSh*, No. 6, 1951, p. 21
1952	475	c. 500 *VVSh*, No. 7, 1953, p. 24

The observed divergence in the figures requires further comment. It is an example of the uncertainties inherent in Soviet statistical reporting, which emphasizes the need for close examination of dates of reporting (whenever this is possible). The figures reported in Galkin are on a calendar year basis. The annual figures for the 1937–45 period were also reported (by the *VAK*) on a calendar year basis. But then, as we observe upon renewed examination of *VVSh*, the dates of reporting become different. The figures for 1947 and 1948 refer to the "academic years" 1946–47 and 1947–48 respectively. The 1949 figure is based only on October 1948 through May 1949 reporting. For 1950 the statement is made that it refers to degrees awarded "in the course of the year" (which "year": calendar or academic?). The figure for 1953 is an approximation only. In this way, what seems at first glance to be an irreconcilable divergence in the figures turns out to be attributable to the differences in the dates of reporting.

1937–40, 41–45, 46–50, 51–55B.—Reported totals—Galkin, *Nau Kadry*, p. 155. Annual averages are derived from these totals.

1957B.—Estimate of 385 derived as follows: Net increment in the number of doctor degree holders in 1957 was 200 (Table V–B–2; *NarKhoz–1959*, p. 843). Assuming the annual attrition rate of 1.9 percent (see Supplement 2 to Table V–A–3) and applying it to the 1956 base, we obtain the number of losses as 185, for a total estimate of degrees awarded (increment plus losses) of 385.

1958B.—Estimate of 490 derived as follows: net increment in the number of doctor degree holders in 1958 was 300 (Table V–B–2; *NarKhoz–1959*, p. 843). Assuming the annual attrition rate of 1.9 percent (see Supplement 2 to Table V–A–3) and applying it to the 1957 base, we obtain the number of losses as 190, for a total estimate of degrees awarded (increment plus losses) of 490.

1959B.—Estimate of 500 derived as follows; Net increment in the number of doctor degree holders in 1959 was 300 (Table V–B–2; *Pravda*, Jan. 22, 1960). Assuming the annual attrition rate of 1.9 percent (see Supplement 2 to Table V–A–3) and applying it to the 1958 base, we obtain the number of losses as 200, for a total estimate of degrees awarded (increment plus losses) of 500.

SUPPLEMENT 1 TO TABLE V–A–3.—*Award of candidate degrees, 1946–53, total and by sex*

According to T. K. Galkin's report to UNESCO, the following data were released: [1]

The following statistics provided by the Higher Statistical Committee of the U.S.S.R. Ministry of Higher Education, show the increase of women *Kandidats* of science for the period 1946–53:

Year	*Number of kandidats defending theses*	*Number of women kandidats defending theses*	*Percent of women*
1946	3,188	940	29.0
1947	4,750	1,422	30.0
1948	5,642	1,655	29.0
1949	4,264	1,193	28.0
1950	4,910	1,516	30.0
1951	5,564	1,811	32.0
1952	6,702	2,275	34.0
1953	8,534	2,946	34.0
Total:	43,554	13,756	31.0

It is not clear from the designation "number of *kandidats* defending theses" whether this refers to actual *awards* of degrees in that academic year or not. Except for the coincidence of Galkin's figure for 1948 (3188) with that in Table V–A–3, the series above diverge from the figures reported in Table V–A–3. The total for the period 1946–50 (i.e., 22,754 candidate degrees awarded) also coincides with the total in Table V–A–3. This suggests that very likely the "defense of the thesis" has the same meaning as degrees awarded, although there could be differences as to the dates for which reporting is made and consequently the annual data on the number of theses defended and degrees granted also differ slightly.

[1] UNESCO, *Access of Women to Higher Education*, 28 January 1958, Annex 2, p. 9.

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SUPPLEMENT 2 TO TABLE V–A–3.—*Estimated attrition rates among advanced degree holders of candidate and doctor, 1954–57*

On the basis of data presented in Table V–B–2 (*NarKhoz–1959*, p. 843), which give the total number of advanced degree holders at the end of a given year, and the actual number of degrees awarded (Table V–A–3) in the course of that year, annual attrition rates for the years 1954–57 may be estimated as follows:

	Candidate	*Doctor*
1954:		
Number of degree holders, year end 1954	69,200	9,000
Number of degree holders, year end 1953	59,500	8,500
Increment during 1954	10,700	500
Actual award of degrees, 1954	12,842	663
Attrition loss; number	2,142	163
in percent of 1953 base	3.6	1.9
1955:		
Number of degree holders, year end 1955	78,000	9,500
Number of degree holders, year end 1954	69,200	9,000
Increment during 1955	8,800	500
Actual award of degrees, 1955	11,800	621
Attrition loss: number	3,000	121
in percent of 1954 base	4.3	1.3
1956:		
Number of degree holders, year end 1956	85,700	9,800
Number of degree holders, year end 1955	78,000	9,500
Increment during 1956	7,700	300
Actual award of degrees, 1956	7,800	539
Attrition loss: number	100	239
in percent of 1955 base	negl.	2.5
1957:		
Number of degree holders, year end 1957	87,200	10,000
Number of degree holders, year end 1956	85,700	9,800
Increment during 1957	1,500	200
Actual award of degrees, 1957	3,500	(1)
Attrition loss: number	2,000	(1)
in percent of 1956 base	2.3	(1)
Average attrition rate in percent during 1953–57	2.5	1.9

[1] Not available.

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TABLE V–A–4.—*Number and distribution by field of candidate degrees awarded in the U.S.S.R., 1937–55; employment of candidate degree holders as of October 1, 1955 and estimated losses*

Fields of knowledge	Award of candidate degrees by period							Candidate degree holders employed as of October 1, 1955		Losses during the period 1937–55	
	1937 through 1940	1941 through 1945	1946 through 1950	1951 through 1955	1937–55 Total						
					Annual average	No.	Percent	No.	Percent	No.	Percent of col. F
	A	B	C	D	E	F	G	H	I	J	K
I. *Physical Sciences, Total*	5,276	4,397	9,973	16,700	1,913	35,346	41.0	32,918	42.2	—3,428	9.4
1. Engineering sciences	3,786	3,150	6,971	11,996	1,363	25,903	29.3	[a]20,653 (23,459)	26.5	[a]—5,250	.....
2. Physical-mathematical	775	500	1,007	1,962	224	4,244	4.8	[a] 5,364 (3,842)	6.9	[a]+1,120	.....
3. Chemistry	499	452	1,188	1,714	203	3,853	4.3	[a] 4,639 (3,490)	5.9	[a]+ 786	.....
4. Geology-mineralogy	216	295	807	1,028	123	2,346	2.6	[a] 2,262 (2,127)	2.9	[a]— 84	.....
II. *Biological Sciences, Total*	5,656	3,621	7,048	12,202	1,501	28,527	32.1	24,001	30.8	—4,526	15.9
5. Biology	780	686	1,536	2,948	313	5,950	6.6	5,544	7.1	— 406	6.8
6. Agricultural	668	601	1,554	2,467	278	5,290	6.0	6,021	7.7	— 690	10.2
7. Veterinary medicine	240	111	392	678	75	1,421	1.6				
8. Medical	3,942	2,202	3,474	6,016	823	15,634	17.6	12,436	16.0	—3,430	21.6
9. Pharmaceutical	26	21	92	93	12	232	0.3				
III. *Humanities and Social Sciences, Arts and Education, Total*	1,447	1,652	5,664	14,101	1,203	22,864	25.8	20,101	25.8	—2,763	12.1
10. Philology	311	385	1,021	2,834	239	4,551	5.1	4,062	5.2	— 489	.....
11. History	239	316	1,758	4,110	339	6,423	7.2	6,987	9.0	—1,078	.....
12. Philosophy	50	78	400	1,114	86	1,642	1.9				
13. Pedagogy	242	222	618	1,643	143	2,725	3.1	1,923	2.5	— 802	.....
14. Economics and planning	171	276	925	2,347	196	3,719	4.2	[b]3,762	4.8	[b]+ 43	.....
15. Art and art history[c]	55	93	202	372	38	722	0.8	617	0.8	— 105	.....
16. Architecture	32	34	108	233	21	407	0.5	376	0.5	— 31	.....
17. Geography	247	184	389	587	74	1,407	1.6	1,347	1.7	— 60	.....
18. Jurisprudence	100	64	243	861	67	1,268	1.4	1,027	1.3	— 241	.....
IV. *Other* (unspecified)[d]	174	86	59	617	49	936	1.1	941	1.2	+ 5	.....
Actual Total	12,553	9,756	22,744	43,620	4,666	88,673	100.0	77,961	100.0	—10,712	12.1
Unexplained difference	none	+20	—10	—16	.....	—6	.....	.....	.....	.....	.....
Reported Grand Total	12,553	9,736	22,754	43,636	.....	88,679	.....	.....	.....	.....	.....
Annual Average	3,138	1,947	4,550	8,727	.....	4,667	.....	.....	.....	.....	.....

a, b, c, d—see explanation in Sources and Notes. ( )—adjusted figures.

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SOURCES AND NOTES

Column in Table *Source and Discussion*

A, B, C, D, F.—Galkin, *Nau Kadry*, p. 156.

E, G.—Computed from *F*.

H.—*KS–1956*, p. 250. The figures incorporated into the table in column *H* are those stated by the source. *KS–1956* reports, however, groupings of candidate degree holders by field of knowledge slightly different from those reported in columns *A–D* and *F*. This difference in grouping is particularly pronounced in the physical sciences, where the engineering science component for degrees awarded has been redistributed in such a way as to supplement the physical-mathematical and chemistry fields. The actual examination of the types of candidate degrees by field (*VyShko–1948*, pp. 342–95) which are classified under "engineering sciences" reveals that indeed a number of fields could be easily reclassified under chemistry, physics or mathematics. This apparently happened in the *KS–1956* compilation. It turns out (as should be expected) that in the physical sciences, as well as in other fields, the plus and minus for figures referring to individual fields balance out in the totals. Because of this reclassification it is necessary to adjust some figures in column *H* to the base reporting in column *F*. This adjustment is shown in parenthesis and was derived as follows:

	F	—	J	H
	Given No.	*Derived distribution, in percent*	*Actual losses, redistributed*	*1955 Totals adjusted to F-base*
IV. Physical Sciences, Total	36,346	100.0	–3,428	32,918
1. Engineering sciences	25,903	71.3	–2,444	23,454
2. Physical-mathematical	4,244	11.7	– 402	3,842
3. Chemistry	3,853	10.6	– 363	3,490
4. Geology-mineralogy	2,346	6.4	– 219	2,127

Adjusted *H* derived by subtracting *J* from *F*.

Footnote a.—It was assumed that the reclassification took place among all fields in the physical sciences, and in order to adjust column *H* to the reporting base of column *F* the following computations were made:

Footnote b.—In the fields of the humanities and social sciences, such redistribution as was made in the physical sciences above could be made here as well (see example for doctorates, in Sources and Notes, Table V–A–5 below). The transfer of students most likely takes place among the fields of history, philosophy, pedagogy, art and art history, and geography. Such adjustments, however, were not made. This, however, explains the positive attrition rate in the field indicated by the footnote.

I.—Distribution derived from column *H*.

J.—Losses are derived as a difference by subtracting *H* from *F*. For a discussion of redistribution of losses, see footnotes *a* and *b* above.

K.—Derived rate of losses during the 19–year period in percent of *J* to *F*.

Footnote c.—Refers to fine arts, painting, sculpture, music, the theater, cinema and related fields.

Footnote d.—Refers to physical culture and, mainly, to military sciences.

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TABLE V–A–5.—*Number and distribution by field of doctor degrees awarded in the U.S.S.R., 1937–55; employment of doctor degree holders as of October 1, 1955 and estimated losses*

Fields of knowledge	Award of doctor degrees by period							Doctor degree holders employed as of October 1, 1955			Losses during the period 1937–55	
	1937 through 1940	1941 through 1945	1946 through 1950	1951 through 1955	1937–55 Total			No.		Percent	No.	Percent of col. F
					Annual average	No.	Percent					
	A	B	C	D	E	F	G	H		I	J	K
I. *Physical Sciences, Total*	873	928	1,123	1,198	217	4,122	38.6	3,786		40.0	[a]— 336	8.1
1. Engineering sciences	514	539	623	684	124	2,360	22.1	[a]1,855	(2,168)	19.6	[a]— 505	.....
2. Physical-mathematical	155	131	174	180	34	640	6.0	[a] 825	(588)	8.7	[a]+ 185	.....
3. Chemistry	109	151	152	184	31	596	5.6	[a] 626	(547)	6.6	[a]+ 30	.....
4. Geology-mineralogy	95	107	174	150	28	526	4.9	[a] 480	(483)	5.1	[a]— 49	.....
II. *Biological Sciences, Total*	1,560	1,124	1,158	1,293	270	5,135	48.1	4,457		47.1	— 678	13.2
5. Biology	273	245	254	318	57	1,090	10.2	946		10.0	— 144	13.2
6. Agricultural	94	108	133	198	28	533	5.0	} 736		} 7.8	} — 121	} 14.1
7. Veterinary medicine	81	73	74	96	17	324	3.0					
8. Medical	1,106	693	689	677	167	3,165	29.7	} 2,775		} 29.3	} — 433	} 13.6
9. Pharmaceutical	6	5	8	4	1	23	0.2					
III. *Humanities and Social Sciences, Arts and Education, Total*	269	319	415	388	74	1,391	13.1	1,197		12.7	— 194	13.9
10. Philology	43	61	90	87	15	281	2.7	248		2.6	— 33	11.7
11. History	78	87	89	68	17	322	3.0	} [b]325	(337)	} 3.5	} [b]— 69	.....
12. Philosophy	3	11	22	36	4	72	0.7					
13. Pedagogy	36	26	24	30	6	116	1.1	[b] 74	(100)	0.8	[b]— 42	.....
14. Economics and planning	49	44	52	79	12	224	2.2	203		2.1	— 21	9.4
15. Art and art history[c]	6	27	31	13	4	77	0.7	[b] 81	(66)	0.9	[b]+ 4	.....
16. Architecture	7	11	19	6	2	43	0.4	31		0.3	— 12	27.9
17. Geography	21	26	44	42	7	133	1.2	[b] 144	(116)	1.5	[b]+ 11	.....
18. Jurisprudence	26	26	44	27	6	123	1.1	91		1.0	— 32	26.0
IV. *Other* (unspecified)[d]	1	9	9	7	1	26	0.2	20		0.2	— 6	23.0
Total	2,703	2,380	2,705	2,886	561	10,674	100.0	9,460		100.0	—1,214	11.4
Annual Average	676	476	541	577	.....	562	.....	.....		.....	— 65	.....

a, b, c, d—see explanation in Sources and Notes. ( )—adjusted figures.

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SOURCES AND NOTES

Place in Table — *Source and Discussion*

A, B, C, D, F.—Galkin, *Nau Kadry*, p. 155.

E, G.—Computed from *F.*

H.—*KS–1956*, p. 250. The figures incorporated into the table in column *H* are those stated by the source. *KS–1956* reports, however, groupings of doctor degree holders by field of knowledge slightly different from those reported in columns *A–D* and *F*. This difference in grouping is particularly pronounced in the physical sciences, where the engineering science component for degrees awarded has been redistributed in such a way as to supplement the physical-mathematical and chemistry fields. The actual examination of the types of doctorates by field (*VyShko–1948*, pp. 342–95) which are classified under "engineering sciences" reveals that indeed a number of fields could be easily reclassified under chemistry, physics or mathematics. This apparently happened in the *KS–1956* compilation. It turns out (as should be expected) that in the physical sciences, as well as in other fields, the plus and minus for figures referring to individual fields balance out in the totals. Because of this reclassification it is necessary to adjust some figures in column *H* to the base reporting in column *F*. This adjustment is shown in parenthesis and was derived as follows.

Footnote a.—It was assumed that the reclassification took place among all fields in the physical sciences, and in order to adjust column *H* to the reporting base of column *F* the following computations were made:

Rows	F *Given Number*	– *Derived distribution in percent*	J *Actual losses, redistributed*	H *1955 Totals Adjusted to F-base*
IV. Physical Sciences, Total	4,122	100.0	–336	3,786
1. Engineering sciences	2,360	57.2	–192	2,168
2. Physical-mathematical	640	15.5	– 52	588
3. Chemistry	596	14.5	– 49	547
4. Geology-mineralogy	526	12.8	– 43	483

Adjusted *H* derived by subtracting *J* from *F*.

Footnote b.—Similarly, it was assumed (on the basis of an examination of the types of doctor degrees) that the most likely components of reclassification are history-philosophy (combined), pedagogy, art and art history and geography. The adjusted figures in column H were derived as follows:

Rows	F *Given Number*	– *Derived distribution in percent*	J *Actual losses, redistributed*	M *1955 Totals Adjusted to F-base*
III. Humanities and social sciences, art and education, total	1,391	100.0	–194	1,197
11 and 12. History-philosophy	392	28.4	– 55	337
13. Pedagogy	116	8.4	– 16	100
15. Art and art history	77	5.5	– 11	66
17. Geography	133	9.6	– 17	116
(All other fields in group III which remain unaffected)	(673)	(48.9)	(95)	(578)

I.—Distribution derived from column *H*.

J.—Losses are derived as a difference by subtracting *H* from *F*. For a discussion of redistribution of losses, see footnotes *a* and *b* above.

K.—Derived rate of losses during the 19-year period in percent of *J* to *F*.

Footnote c.—Refers to fine arts, painting, sculpture, music, the theater, cinema and related fields.

Footnote d.—Refers to physical culture and, mainly, to military sciences.

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TABLE V–B–1.—*Number of research, academic and advanced degree personnel in Soviet higher educational and research establishments, 1914–60*

[in thousands]

Year end	Grand total: Regular and plurality			Higher educational establishments			Research establishments			Other organizations		
	T	Reg.	Pl.	T	Reg.	Pl.	T	Reg.	Pl.	T	Reg.	Pl.
	A	B	C	D	E	F	G	H	I	J	K	L
1914.....	10.2	10.2	(n)	6.0	6.0	(n)	4.2	4.2	(n)	(n)	(n)	(n)
1924.....	.....	.....	(n)	17.7	17.7	(n)	.....	.....	(n)	(n)	(n)	(n)
1925.....	.....	.....	(n)	.....	.....	(n)	.....	.....	(n)	(n)	(n)	(n)
1926.....	.....	.....	(n)	.....	.....	(n)	.....	.....	(n)	(n)	(n)	(n)
1927.....	.....	.....	(n)	16.4	[1]16.4	(n)	.....	.....	(n)	(n)	(n)	(n)
1928.....	.....	.....	(n)	.....	.....	(n)	.....	.....	(n)	(n)	(n)	(n)
1929.....	(45.5)	.....	.....	[1]22.9	[1]13.8	(9.1)	22.6	.....	.....	(n)	(n)	(n)
1930.....	.....	.....	.....	.....	.....	.....	30.7	.....	.....	(n)	(n)	(n)
1931.....	(100.4)	.....	.....	[1]58.2	[1]26.2	(32.0)	42.2	.....	.....	(n)	(n)	(n)
1932.....	.....	.....	.....	.....	.....	.....	47.9	.....	.....	(n)	(n)	(n)
1933.....	(100.8)	.....	.....	[52.5]	.....	.....	48.3	.....	.....	(n)	(n)	(n)
1934.....	(93.9)	.....	.....	[48.0]	.....	.....	45.9	.....	.....	(n)	(n)	(n)
1935.....	.....	.....	.....	.....	.....	.....	39.1	.....	.....	(n)	(n)	(n)
1936.....	.....	.....	.....	.....	.....	.....	37.6	.....	.....	.....	.....	.....
1937.....	.....	.....	.....	.....	.....	.....	35.6	.....	.....	.....	.....	.....
1938.....	.....	.....	.....	.....	.....	.....	34.6	.....	.....	.....	.....	.....
1939.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1940.....	98.3	.....	.....	61.4	[1]50.1	(11.3)	26.4	.....	.....	(10.5)	.....	.....
1941.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1942.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1943.....	.....	.....	.....	.....	[1]24.7	.....	.....	.....	.....	.....	.....	.....
1944.....	.....	.....	.....	[1]52.0	[1]42.1	(9.9)	.....	.....	.....	.....	.....	.....
1945.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1946.....	.....	.....	.....	[1]74.3	[1]67.3	(7.0)	.....	.....	.....	.....	.....	.....
1947.....	145.6	.....	.....	81.5	.....	.....	59.3	.....	.....	4.8	.....	.....
1948.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1949.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1950.....	162.5	.....	.....	86.5	[1][80.0]	(6.5)	70.5	.....	.....	5.5	.....	.....
1951.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1952.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1953.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1954.....	210.2	.....	.....	114.2	[1]86.0	(28.2)	88.7	.....	.....	7.3	.....	.....
1955.....	223.9	.....	.....	119.1	.....	.....	96.5	.....	.....	8.3	.....	.....
1956.....	239.9	.....	.....	125.0	.....	.....	106.4	.....	.....	(8.5)	.....	.....
1957.....	261.6	.....	.....	132.3	.....	.....	121.5	.....	.....	(8.1)	.....	.....
1958.....	284.0	.....	.....	135.7	.....	.....	141.0	.....	.....	(7.3)	.....	.....
1959.....	310.0	.....	.....	137.8	.....	.....	164.8	.....	.....	(7.4)	.....	.....
1960.....	354.2	.....	.....	146.9	.....	.....	200.1	.....	.....	(7.2)	.....	.....

[1] Figures also reported in *SPM*, p. 335.
( )—Figures derived by substraction or addition.
n—none, negligible or not applicable
[ ]—Estimated figures.

T—Total.
Reg—Regular (full-time).
Pl—Plurality (part-time).

SOURCES AND NOTES TO TABLE V–B–1

General note.—The figures are arranged in such a way as to have the reporting as of the year end. Actually the figures for 1947 down through 1955 are reported as of October 1 of the given year. The figures for 1946 are as of January 1, 1947; for 1944, as of January 1945; for 1943, as of November 1943; for 1940, as of October 1, 1940. The years 1931 down through 1938 are as of January of the following year (i.e., 1938 equals January 1, 1939). The year 1930 is as of March 1931; 1929 is as of January of the following year; likewise 1924 down through 1928. The column designations are as follows:

Col. A, D, G. J.—Refer to the grand total number of "jobs" (positions filled), one or more of which may be held by the same actual person.

Col. B, E, F, K.—Refer to the actual number of persons employed in staff positions.

Col. C, F, I, L.—Refer to plurality job-holders

Col. J, K, L.—"Other organizations" refer to *RAP* in government, administration, industry, party, trade-union and other such organizations.

Column in Table — *Source and Discussion*

1914 B,E,H.—SSSR-Tsif–1958, p. 363, presents figures for 1914. In addition to this source, the figure of 10,000 for 1914A is given in *KS–1956*, p. 248. Sinetskii, *PP Kadry*, p. 35, gives the figure of 6,900 for 1916 (i.e., an approximation to 1914D).

1914 A, D, G.—The figures for the total are the same as those stated for regular *RAP* in 1914 B, E, H because plural job-holdings were not a recognized phenomenon. Multiple-job holders were few in number.

1940, 1950, 1956, 1957 A,D,G.—Figures incorporated in this table from the sources indicated for the respective years in

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the notes below appear also in *SSSR-Tsif–1958*, p. 363, and *NarKhoz–1959*, p. 93.

1924 E.—Sinetskii, *PP Kadry*, p. 57.

1927 E.—Sinetskii, *PP Kadry*, p. 61.

1929 G.—*Kul't Stroi–1940*, p. 230. The figure for 1929 is that for April 1, 1929. The date is explicitly given. Note that the same figure is given "as of the end of 1929" in *SC-Eng–1936*, p. 466.

1930 G.—*NarKhoz–1932*, p. 546. *Kul't Stroi–1935*, p. 143, gives the figure of 31,600 for the beginning of the year 1931.

1929, 1931, 1940, 1943, 1944, 1946 E.—Sinetskii, *PP Kadry*, p. 104.

1929 D.—Sinetskii, *PP Kadry*, pp. 66 and 105. The 22,900 figure is also in *NarKhoz–1932*, p. 540.

1929 F.—As a difference, 22,900 (total *RAP* in higher educational establishments) minus 15,800 (regular *RAP* in higher educational establishments).

1931 D.—Sinetskii, *PP Kadry*, p. 79.

1931 G.—*SC-Eng–1936*, p. 466; and *Sots Stroi–1936*, p. 589.

1932 G.—*Kul't Stroi–1940*, p. 230, reports the figure of 47,900 *RAP* in "all" research establishments.

1933 G.—*Kul't Stroi–1935*, p. 143. The figure includes 41,300 in main research institutes and their divisions and 7,000 in other research institutes. The identical total figure (48,300) is in *SC-Eng.–1936*, p. 466.

Kul't Stroi–1940, p. 230, reports the figure of 41,300 in research establishments. In order to "smooth" over the drop in the number of *RAP* (after 1935), this latter source apparently excludes personnel in branch establishments.

1934 G.—*SC-Eng–1936*, p. 466; *Sots Stroi–1936*, p. 589. The figure 45,900 includes 38,200 in main research institutes and their divisions and 7,700 in all other research establishments. *Kul't Stroi–1940*, p. 230, reports the figure of 38,700 *RAP* in research establishments. Apparently the same manipulation of statistics as mentioned in the note to 1933G above was performed for 1934G also.

1933, 1934 D.—Figures are estimated on the basis of the teacher-student ratio, which is obtained from the data in *Kul't Stroi–1935*, p. 63.

1935–38 G.—*Kul't Stroi–1940*, p. 230. All figures are as of January 1 of the calendar year that follows the year indicated in the table (i.e., all January 1 references were converted to "year end" entries).

1940 A.—*KS–1956*, p. 248; *NKh–1956*, p. 233.

1940 A, D, G, J.—*SSSR-Tsif–1958*, p. 363. For 1940D Sinetskii, *PP Kadry*, p. 93, states that there were "more than 60,000" *RAP* in higher educational establishments, of whom "over 10,000" were plurality job-holders.

1943 E.—Sinetskii, *PP Kadry*, *p. 96*. Same figure appears also on the graph (p. 104).

1944 D, E.—Sinetskii, *PP Kadry*, p. 100.

1946 D.—Sinetskii, *PP Kadry*, p. 105. It should be noted that of 74,300 total appointees in higher education, 67,300 had staff appointments, but among these 46,100 had only one job and 21,200 had more than one job.

1947, 1950, 1955 A, D, G, J.—*KS–1956*, p. 248. Figures as of October 1 of the corresponding year.

1950 D.—The figure 86,500, which is included in the table, is from *KS–1956*, p. 248. The corresponding figure estimated in *SPM*, p. 335, is 87,000.

1953A, D, G.—*NarKhoz–1959*, p. 843.

1954 A, D, G.—*NKh–1956*, p. 233. Figures as of October 1.

1954 E.—*VVSh*, No. 3, 1955, p. 3.

1956, 1957 A, D, G.—*SSSR-Tsif–1958*, p. 363. Figures as of October 1. An identical set of figures as those in the table is given for 1956 in *NKh–1957*, p. 257. Similar figures have also appeared in *BSE-YB–1958*, pp. 60, 82 and 94; *Vestnik statistiki*, No. 2, 1958, p. 21 (Itogi 1957); *Pravda*, Jan. 31, 1957 (Itogi 1956).

1958, 1959 A, D, G.—*NarKhoz–1960*, p. 754.

1960 A, D, G.—*SSSR-Tsif–1960*, p. 315.

1956–1960 J.—As a residual.

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TABLE V–B–2.—*Summary data on the composition of Soviet research and academic personnel (RAP) for selected post-war years (as of October 1)*

	1947		1950		1953		1954		1955		1956		1957		1958		1959	
	Thous.	%	Thous.	%	Thous.	%	Thous.	%	Thous.	%	Thous.	%	Thous.	%	Thous.	%	Thous.	%
Total RAP	145.6	100.0	162.5	100.0	191.9	100.0	210.2	100.0	223.9	100.0	239.9	100.0	261.6	100.0	284.0	100.0	310.0	100.0
of whom employed in:																		
research establishments[b]	59.3	40.7	70.5	43.4	80.0	41.7	88.7	42.2	96.5	43.1	106.4	44.3	121.5	46.4	141.0	49.6	164.8	53.2
higher educational estab.	81.5	56.0	86.5	53.2	105.4	54.9	114.2	54.3	119.1	53.2	125.0	52.2	132.3	50.6	135.7	47.8	137.8	44.4
other	4.8	3.3	5.5	3.4	6.5	3.4	7.3	3.5	8.3	3.7	8.5	3.5	7.8	3.0	7.3	2.6	7.4	2.5
Total RAP	145.6	100.0	162.5	100.0	191.9	100.0	210.2	100.0	223.9	100.0	239.9	100.0	261.6	100.0	284.0	100.0	310.0	100.0
of whom:																		
with doctor's degree	7.7	5.3	8.3	5.1	8.5	4.4	9.0	4.3	9.5	4.2	9.8	4.1	10.0	3.8	10.3	3.6	10.6	3.4
with candidate's degree	36.9	25.3	45.5	28.0	59.5	31.0	69.2	32.9	78.0	34.8	85.7	35.7	87.2	33.3	90.0	31.7	93.4	30.3
without advanced degree[a]	101.0	69.4	108.7	66.9	123.9	64.6	132.0	62.8	136.4	61.0	144.4	60.2	164.4	62.9	183.7	64.7	205.0	66.3
Total RAP	145.6	100.0	162.5	100.0	191.9	100.0	210.2	100.0	223.9	100.0	239.9	100.0	261.6	100.0	284.0	100.0	310.0	100.0
of whom with academic rank:																		
professor	8.9	6.1	8.9	5.5	8.5	4.4	8.8	4.2	9.0	4.0	9.1	3.8	9.4	3.6	9.6	3.4	9.7	3.2
associate professor	20.2	13.9	21.8	13.4	24.7	12.9	26.8	12.7	28.6	12.8	30.4	12.7	31.6	12.1	32.7	11.5	34.3	11.1
senior research associate	9.8	6.7	11.4	7.0	12.9	6.7	14.0	6.7	14.6	6.5	15.6	6.6	16.7	6.4	17.2	6.1	18.4	5.9
junior research associate and assistant professor	25.6	17.6	19.6	12.1	19.8	10.3	16.2	7.7	17.1	7.6	17.8	7.4	21.3	8.1	23.6	8.3	26.3	8.5
other (lower ranks)[a]	81.1	55.7	100.8	62.0	126.0	65.7	144.4	68.7	154.6	69.1	167.0	69.5	182.6	69.8	200.9	70.7	221.3	71.3

[a] Derived as a residual.
[b] Includes research establishments and academies of the USSR and union republics.

SOURCES: For 1947, 1950, 1955: *KS–1956*, p. 248; for 1950, 1954, 1955: *NKh–1956*, p. 233; p. 363; for 1953, 1956, 1957, 1958: *NarKhoz–1959*, p. 843; 1959: *NarKhoz–1960*, p. 754. for 1950, 1955, 1956: *Dos–1957*, p. 248; *NKh–1957*, pp. 257–58; for 1957: *SSSR–Tsif–1958*,

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TABLE V–B–3.—*Distribution of RAP total, with doctor's degrees and with candidate's degrees by field of knowledge as of October 1, 1955*

Fields of knowledge		Total		With doctor's degree		With candidate's degree		Without advanced degree	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Physical Sciences	Number	103,272	46.2	3,786	40.0	32,918	42.2	66,568	48.8
	Percent	100.0		3.7		31.9		64.4	
Engineering	Number	61,107	27.3	1,855	19.6	20,653	26.5	38,599	28.3
	Percent	100.0		3.0		33.8		63.2	
Physical-mathematical	Number	20,077	9.0	825	8.7	5,364	6.9	13,888	10.2
	Percent	100.0		4.1		26.7		69.2	
Chemistry	Number	16,435	7.4	626	6.6	4,639	5.9	11,170	8.2
	Percent	100.0		3.8		28.2		70.0	
Geology-Mineralogy	Number	5,653	2.5	480	5.1	2,262	2.9	2,911	2.1
	Percent	100.0		8.5		40.0		51.5	
Biological Sciences	Number	51,470	23.0	4,457	47.1	24,001	30.8	23,012	16.8
	Percent	100.0		8.7		46.6		44.7	
Biology	Number	11,009	4.9	946	10.0	5,544	7.1	4,519	3.3
		100.0		8.6		50.4		41.0	
Agricultural and veterinarian	Number	15,135	6.8	736	7.8	6,021	7.7	8,378	6.1
	Percent	100.0		4.8		39.8		55.4	
Medical and pharmaceutical	Number	25,326	11.3	2,775	29.3	12,436	16.0	10,115	7.4
	Percent	100.0		11.0		49.0		40.0	
Arts, Education, Humanities and Social Sciences	Number	62,637	27.9	1,197	12.7	20,101	25.8	41,339	30.3
	Percent	100.0		1.9		32.1		66.0	
Philology	Number	17,743	7.9	248	2.6	4,062	5.2	13,433	9.9
	Percent	100.0		1.4		22.9		75.7	
History and philosophy	Number	15,305	6.8	325	3.5	6,987	9.0	7,993	5.9
	Percent	100.0		2.1		45.6		52.3	
Pedagogy	Number	11,478	5.1	74	0.8	1,923	2.5	9,481	7.0
	Percent	100.0		0.6		16.8		82.6	
Economics and planning	Number	8,247	3.7	203	2.1	3,762	4.8	4,282	3.1
	Percent	100.0		2.5		45.6		51.9	
Art and art history[a]	Number	4,000	1.8	81	0.9	617	0.8	3,302	2.4
	Percent	100.0		2.0		15.4		82.6	
Architecture	Number	876	0.4	31	0.3	376	0.5	469	0.3
	Percent	100.0		3.5		42.9		53.6	
Geography	Number	3,381	1.5	144	1.5	1,347	1.7	1,890	1.4
	Percent	100.0		4.3		39.8		55.9	
Jurisprudence	Number	1,607	0.7	91	1.0	1,027	1.3	489	0.3
	Percent	100.0		5.7		63.9		30.4	
Other (unspecified)[b]	Number	6,514	2.9	20	0.2	941	1.2	5,553	4.1
	Percent	100.0		0.3		14.5		85.2	
TOTAL	Number	223,893	100.0	9,460	100.0	77,961	100.0	136,472	100.0
	Percent	100.0		4.2		34.8		61.0	

[a] "Art," as defined in Russian terminology, covers fine arts, painting, sculpture; music; the theater, cinema and related fields.
[b] Presumably this should cover such fields as physical culture, sociopolitical fields (not specified elsewhere) and military science (?).

SOURCE: *KS–1956*, p. 250.

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TABLE V–B–4.—*Distribution of RAP total, with doctor's degrees and with candidate's degrees by field of knowledge as of October 1, 1958*

Fields of knowledge		Total		With doctor's degree		With candidate's degree		Without advanced degree	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Physical Sciences	Number	143,107	50.4	4,155	40.4	37,583	41.8	101,369	55.1
	Percent	100.0		2.9		26.3		70.8	
Engineering	Number	92,148	32.4	2,063	20.1	23,869	26.5	66,216	36.0
	Percent	100.0		2.2		25.9		71.9	
Physical-mathematical	Number	22,564	7.9	914	8.9	5,861	6.5	15,789	8.6
	Percent	100.0		4.1		25.9		70.0	
Chemistry	Number	20,227	7.2	648	6.3	5,199	5.8	14,380	7.8
	Percent	100.0		3.2		25.7		71.1	
Geology-Mineralogy	Number	8,168	2.9	530	5.1	2,654	3.0	4,984	2.7
	Percent	100.0		6.5		32.5		61.0	
Biological Sciences	Number	61,479	21.6	4,748	46.2	27,593	30.7	29,138	15.8
	Percent	100.0		7.7		44.9		47.4	
Biology	Number	13,182	4.6	1,051	10.2	6,281	7.0	5,850	3.2
	Percent	100.0		8.0		47.6		44.4	
Agricultural and veterinarian	Number	18,639	6.6	800	7.8	7,090	7.8	10,749	5.8
	Percent	100.0		4.3		38.1		57.6	
Medical and pharmaceutical	Number	29,658	10.4	2,897	28.2	14,222	15.9	12,539	6.8
	Percent	100.0		9.8		48.0		42.2	
Arts, Education, Humanities and Social Sciences	Number	72,458	25.5	1,357	13.2	23,661	26.3	47,440	25.9
	Percent	100.0		1.9		32.6		65.5	
Philology	Number	19,715	6.9	299	2.9	4,936	5.5	14,480	7.9
	Percent	100.0		1.5		25.0		73.5	
History and philosophy	Number	17,088	6.0	359	3.5	8,311	9.3	8,418	4.6
	Percent	100.0		2.1		48.6		49.3	
Pedagogy	Number	12,765	4.5	80	0.8	2,192	2.4	10,493	5.7
	Percent	100.0		0.6		17.2		82.2	
Economics and planning	Number	11,614	4.1	243	2.4	4,475	5.0	6,896	3.8
	Percent	100.0		2.2		38.6		59.2	
Art and art history[a]	Number	4,416	1.6	73	0.7	673	0.7	3,670	2.0
	Percent	100.0		1.6		15.2		83.1	
Architecture	Number	1,127	0.4	41	0.4	404	0.4	682	0.4
	Percent	100.0		3.6		35.8		60.6	
Geography	Number	3,799	1.3	160	1.5	1,440	1.6	2,199	1.2
	Percent	100.0		4.2		37.9		57.9	
Jurisprudence	Number	1,934	0.7	102	1.0	1,230	1.4	602	0.3
	Percent	100.0		5.3		63.6		31.1	
Other (unspecified)[b]	Number	6,994	2.5	22	0.2	1,123	1.2	5,849	3.2
	Percent	100.0		0.3		16.1		83.6	
Total	Number	284,038	100.0	10,282	100.0	89,960	100.0	183,796	100.0
	Percent	100.0		3.6		31.7		64.7	

[a] "Art," as defined in Russian terminology, covers fine arts, painting, sculpture; music; the theater, cinema and related fields.

[b] Presumably this should cover such fields as physical culture, sociopolitical fields not specified elsewhere) and military science (?).

SOURCE: *NarKhoz-1959*, p. 845.

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TABLE V–B–5.—*Distribution of RAP total, with doctor's degrees and with candidate's degrees by field of knowledge as of October 1, 1959*

Fields of knowledge		Total		With doctor's degree		With candidate's degree		Without advanced degree	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Physical Sciences	Number	163,505	52.7	4,372	41.5	39,875	42.4	119,258	58.0
	Percent	100.0		2.7		24.4		72.9	
Engineering	Number	106,960	34.5	2,169	20.6	25,303	26.9	79,488	38.6
	Percent	100.0		2.0		23.6		74.4	
Physical-mathematical	Number	24,831	8.0	958	9.1	6,262	6.7	17,611	8.6
	Percent	100.0		3.9		25.2		70.9	
Chemistry	Number	22,724	7.3	682	6.5	5,489	5.8	16,553	8.1
	Percent	100.0		3.9		24.2		72.8	
Geology-Mineralogy	Number	8,990	2.9	563	5.3	2,821	3.0	5,606	2.7
	Percent	100.0		6.3		31.4		62.3	
Biological Sciences	Number	64,825	20.9	4,748	45.1	28,704	30.5	31,373	15.3
	Percent	100.0		7.4		44.2		48.4	
Biology	Number	13,611	4.4	1,068	10.1	6,452	6.9	6,091	3.0
	Percent	100.0		7.8		47.4		44.8	
Agricultural and veterinarian	Number	20,210	6.5	798	7.6	7,312	7.8	12,100	5.9
	Percent	100.0		3.0		36.1		60.0	
Medical and pharmaceutical	Number	31,004	10.0	2,882	27.4	14,940	15.9	13,182	6.4
	Percent	100.0		9.3		48.2		42.5	
Arts, Education, Humanities and Social Sciences	Number	74,451	24.0	1,388	13.2	24,264	25.8	48,799	23.8
	Percent	100.0		1.9		32.6		65.5	
Philology	Number	19,489	6.3	310	2.9	5,011	5.3	14,168	6.9
	Percent	100.0		1.6		25.6		72.8	
History and philosophy	Number	17,490	5.6	371	3.5	8,421	9.0	8,698	4.2
	Percent	100.0		2.2		48.0		49.8	
Pedagogy	Number	13,099	4.2	79	0.8	2,222	2.4	10,798	5.3
	Percent	100.0		0.6		16.9		82.5	
Economics and planning	Number	12,227	3.9	261	2.5	4,690	5.0	7,276	3.5
	Percent	100.0		2.0		38.4		59.6	
Art and art history[a]	Number	4,805	1.6	76	0.7	682	0.7	4,047	2.0
	Percent	100.0		1.6		14.1		84.3	
Architecture	Number	1,339	0.4	36	0.3	450	0.5	853	0.4
	Percent	100.0		2.7		33.6		63.7	
Geography	Number	3,890	1.3	153	1.5	1,547	1.6	2,190	1.1
	Percent	100.0		3.9		39.8		56.3	
Jurisprudence	Number	2,112	0.7	102	1.0	1,241	1.3	769	0.4
	Percent	100.0		4.8		58.7		36.5	
Other (unspecified)[b]	Number	7,241	2.4	22	0.2	1,156	1.2	6,063	2.9
	Percent	100.0		0.3		15.9		83.8	
Total	Number	310,022	100.0	10,530	100.0	93,999	100.0	205,493	100.0
	Percent	100.0		3.4		30.3		66.3	

[a] "Art," as defined in Russian terminology, covers fine arts, painting, sculpture; music; the theater, cinema and related fields.

[b] Presumably this should cover such fields as physical culture, socio-political fields (not specified elsewhere) and military science (?).

SOURCE: *NarKhoz–1960*, p. 756.

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TABLE V–B–6.—*National composition of research and academic personnel (RAP) in the U.S.S.R. for selected years, 1939–59*

[In thousands and percent]

Nationality	1939[a]		1947		1950		1955		1957		1958		1959	
	Thous.	%	Thous.	%	Thous.	%	Thous.	%	Thous.	%	Thous.	%	Thous.	%
Russians	58.2	60.7	85.1	58.3	98.9	60.8	144.3	64.4	168.1	64.2	182.6	64.3	200.0	64.5
Ukrainians	9.5	9.9	12.8	8.8	14.7	9.0	21.8	9.7	25.6	9.8	27.8	9.8	30.2	9.8
Belorussians	1.7	1.8	2.4	1.6	2.7	1.7	4.1	1.8	4.7	1.8	5.1	1.8	5.6	1.8
Uzbeks	0.5	0.5	0.6	0.4	0.8	0.5	1.6	0.7	2.2	0.8	2.7	0.9	3.1	1.0
Kazakhs	0.3	0.3	0.5	0.4	0.7	0.5	1.2	0.5	1.5	0.6	2.0	0.7	2.1	0.7
Georgians	2.1	2.2	3.7	2.6	4.3	2.6	5.3	2.5	6.2	2.4	6.8	2.4	7.3	2.4
Azerbaidzhans	0.9	1.0	1.7	1.1	1.9	1.2	2.8	1.2	3.4	1.3	3.9	1.4	4.4	1.4
Lithuanians	.....	.....	1.1	0.8	1.2	0.7	1.7	0.8	2.1	0.8	2.3	0.8	2.5	0.8
Moldavs	.....	.....	0.1	0.1	0.1	0.1	0.3	0.1	0.4	0.2	0.4	0.2	0.5	0.2
Latvians	.....	.....	1.4	0.9	1.5	0.9	1.8	0.8	2.1	0.8	2.3	0.8	2.4	0.8
Kirgiz	0.04	negl.	0.05	negl.	0.1	0.1	0.3	0.1	0.4	0.2	0.5	0.2	0.5	0.2
Tadzhiks	0.1	0.1	0.1	0.1	0.2	0.1	0.4	0.2	0.6	0.2	0.7	0.3	0.7	0.2
Armenians	2.1	2.2	3.5	2.5	3.9	2.4	5.1	2.4	5.9	2.2	6.4	2.2	7.3	2.2
Turkomen	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.5	0.2	0.5	0.2	0.6	0.2
Estonians	.....	.....	1.2	0.8	1.2	0.7	1.6	0.7	1.8	0.7	1.8	0.6	1.9	0.6
Sub-total	75.54	78.8	114.35	78.5	132.3	81.4	192.6	86.0	225.5	86.2	245.8	86.5	269.1	86.8
Other	20.36	21.2	31.25	21.5	30.2	18.6	31.3[b]	14.0[b]	36.1	13.8	38.2	13.5	40.9[b]	13.2[b]
Official grand total	95.9	100.0	145.6	100.0	162.5	100.0	223.9	100.0	261.6	100.0	284.0	100.0	310.0	100.0

Sources and Notes: *KS–1956*, p. 254; *NarKhoz–1959*, p. 846; *Dos–1957*, p. 285; *NarKhoz–1960*, p. 757.

[a] Data according to the census of population of January 1939. For other years data are as of October 1 of the given year.

[b] "Other" as follows:

	1955		1959	
	Thousands	Percent	Thousands	Percent
Rounded Total	31.3	.....	40.9	13.2
Actual Total	31.532	14.0	.....	.....
Jews	24.620	11.0	30.633	9.8
Karello-Finns	.132	(c)	.149	(c)
Tatars	2.142	0.9	3.207	1.0
Bashkirs	.219	(c)	.354	0.1
Dagestan nationalities	.231	(c)	.425	0.1
Buriats	.168	(c)	.313	0.1
Kabardins	.070	(c)	.087	(c)
Komi	.188	(c)	.254	(c)
Mari	.078	(c)	.097	(c)
Mordvins	.212	(c)	.298	0.1
Ossets	.343	0.2	.562	0.2
Udmurs	.090	(c)	.150	(c)
Chuvash	.398	0.2	.488	0.2
Yakuts	.106	(c)	.143	(c)
All other (unspecified)	2.526	1.1	2.740	1.0

[c] Fraction of 0.1%. The sum of ten q's above equals 0.6%.

APPENDIX V–C–1.—*Soviet Higher Educational and Research Establishments which Offer Advanced Degree Training*

Appendix V–C–1 presents a list of Soviet higher educational and research establishments which have permission to conduct advanced degree training and to accept candidate and doctor degree dissertations. The asterisk denotes institutions, primarily research establishments, which engage in advanced degree training only and do not offer any ordinary professional higher education. The appendix consists of two parts:

Part I, institutions which accept only candidate degree dissertations;

Part II, institutions which accept both candidate and doctor degree dissertations.

Note that although the listing below indicates the administrative subordination of the institutions involved, except for the jurisdictions of the academies, the institutional subordination of in-

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dividual institutions has been changed since the summer of 1956.

PART I.—*List of Soviet higher educational establishments and scientific research institutes accepting candidate degree dissertations only as of August 1956*[1]

Ministry of Higher Education, U.S.S.R.

1. Gor'kii State University
2. Irkutsk State University
3. Kirgiz State University
4. Petrozavodsk State University
5. Perm' State University
6. Uzbek State University
7. Ural State University
8. Kishinev State University
9. Tadzhik State University
10. Turkmen State University

11–19. Select departments of Moscow State University

20–28. Select departments of Leningrad State University

29. Moscow Institute of Economics and Statistics
30. Rostov Institute of Finance and Economics
31. Belorussian Polytechnical Institute
32. Gor'kii Polytechnical Institute
33. Erivan Polytechnical Institute
34. Novocherkassk Polytechnical Institute
35. All-Union Extension-Correspondence Polytechnical Institute
36. Tallin Polytechnical Institute
37. Azerbaidzhan Polytechnical Institute
38. Kaunas Polytechnical Institute
39. Kuibyshev Industrial Institute
40. Leningrad Institute of Aircraft Equipment
41. Moscow Polygraphic Institute
42. Moscow Institute of Aircraft Technology
43. Tula Mechanical Institute
44. Moscow Institute of Physics and Engineering
45. Irkutsk Mining-Metallurgical Institute
46. Kazakh Mining-Metallurgical Institute
47. Siberian Metallurgical Institute
48. Magnitogorsk Mining-Metallurgical Institute
49. Novosibirsk Construction Engineering Institute
50. Gor'kii Construction Engineering Institute
51. Krasnodar Institute of Food Industry
52. Ivanovo Institute of Chemical Technology
53. Ural Institute of Forest Engineering
54. Siberian Institute of Forest Engineering
55. Rostov-on-Don Institute of Agricultural Machine Building
56. Tashkent Textile Institute
57. Belorussian Forestry Engineering Institute
58. Leningrad Textile Institute
59. Moscow Higher Industrial Arts School

Ministry of Trade

60. Leningrad Institute of Soviet Trade

Ministry of Agriculture, U.S.S.R.

61. Azerbaidzhan Agricultural Institute
62. Belorussian Agricultural Academy
63. Kuibyshev Agricultural Institute
64. Gor'kii Agricultural Institute
65. Michurinsk Vegetable-Fruit Institute
66. Saratov Agricultural Institute
67. Lithuanian Agricultural Academy
68. Armenian Agricultural Institute
69. Kazakh Agricultural Institute
70. Uzbek Agricultural Institute
71. Kirgiz Agricultural Institute
72. North Osetin Agricultural Institute
73. Turkmen Agricultural Institute
74. Irkutsk Agricultural Institute
75. Kuban Agricultural Institute
76. Estonian Agricultural Academy
77. Stalingrad Agricultural Institute
78. Stavropol' Agricultural Institute
79. Bashkir Agricultural Institute
80. Voronezh Agricultural Institute
81. Cheliabinsk Institute of Mechanization and Electrification of Agriculture
82. Novocherkassk Engineering and Soil Conservation Institute
83. Tashkent Institute of Irrigation and Mechanization of Agriculture
84. Novocherkassk Veterinary Institute
85. Saratov Veterinary Institute
86. Moscow Agricultural Institute
•87. Research Institute of Agrophysics of All-Union Academy of Agricultural Sciences (VASKhNIL)
88. All-Union Institute of Experimental Agriculture of VASKhNIL
•89. All-Union Research Institute of Plant Protection of VASKhNIL
•90. All-Union Research Institute of Fertilizers and Soil Science of VASKhNIL
•91. All-Union Research Institute of Hydrotechnical Engineering and Soil Conservation of VASKhNIL
92. Odessa Agricultural Institute
93. Belotserkov Agricultural Institute
94. Kiev Hydromelioration Institute
95. Khar'kov Animal Breeding Institute
96. L'vov Veterinary Institute

Ministry of Higher Education of the Ukrainian SSR

97. Chernovitsy State University
98. Khar'kov Engineering Economics Institute
99. Kiev Institute of Finance and Economics
100. Donets Industrial Institute
101. Odessa Polytechnical Institute
102. Khar'kov Mining Institute
103. Dnepropetrovsk Mining Institute
104. Khar'kov Construction Engineering Institute
105. Khar'kov Automotive Transport Institute
106. Kiev Auto Highway Institute
107. Odessa Institute of Food Technology and Refrigeration
108. Odessa Institute of Technology
109. Dnepropetrovsk Institute of Chemical Technology
110. Odessa Construction Engineering Institute

Academy of Sciences of U.S.S.R.

•111. Hydrochemical Institute
•112. Hydrophysical Institute of the Seas
•113. Electrophysical Laboratory
•114. Pacific Branch of the Academy of Sciences

Academy of Sciences of Azerbaidzhan SSR

•115. Institute of Geology

Academy of Sciences of Armenian SSR

•116. Institute of History
•117. Division of Biological Sciences

Academy of Sciences of Belorussian SSR

•118. Institutes of Literature and Arts and Institute of Linguistics
•119. Institutes of the Division of Social Sciences

Academy of Sciences of Kazakh SSR

•120. Institute of Power Engineering
•121. Institute of Metallurgy and Floatation
•122. Institutes of Physiology; Regional Paleontology; Clinical and Experimental Surgery

Academy of Sciences of Kirgiz SSR

•123. Division of Social Sciences

Academy of Sciences of Latvian SSR

•124. Institute of Languages and Literatures

[1] *VyShkoSPR–1957*, pp. 315–19.

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•125. Institute of History and Material Culture
•126. Institute of Agricultural Problems
•127. Institute of Experimental Medicine

Academy of Sciences of Lithuanian SSR
•128. Institute of History

Academy of Sciences of the Ukrainian SSR
•129. Institute of Literature
•130. Institute of Economics
•131. Institute of Botany
•132. Institute of Zoology
•133. Institute of Physical Chemistry
•134. Institute of Ferrous Metallurgy
•135. Institute of History

Academy of Sciences of Uzbek SSR
•136. Institute of Engineering Construction

Academy of Sciences of Estonian SSR
•137. Division of Engineering and Physical-Mathematical Sciences
•138. Division of Agricultural, Biological and Medical Sciences
•139. Division of Social Sciences

Academy of Sciences of Turkmen SSR
•140. Division of Social Sciences
•141. Division of Biological and Agricultural Sciences

Academy of Sciences of Tadzhik SSR
•142. Division of Natural Sciences

Ministry of Aircraft Industry, U.S.S.R.
•143–147. *Secret*

Ministry of Geology and Conservation of Natural Resources, U.S.S.R.
•148. All-Union Research Institute of Natural Resources

Ministry of Public Health, U.S.S.R.
149. Leningrad Chemical-Pharmaceutical Institute
•150. All-Union Chemical-Pharmaceutical Research Institute

Ministry of Public Health of the Russian SFSR
•151. Central Research Institute of Health Resorts
152. Bashkir State Medical Institute
153. Ivanovo State Medical Institute
154. Irkutsk State Medical Institute
155. Perm' State Medical Institute
156. Omsk State Medical Institute
157. Smolensk State Medical Institute
158. Stalingrad State Medical Institute
159. Khabarovsk State Medical Institute
160. Rostov-on-Don State Medical Institute
161. Kuban Medical Institute
162. Novosibirsk Medical Institute

Ministry of Public Health of the Moldav SSR
163. Kishinev State Medical Institute

Ministry of Public Health of Turkmen SSR
164. Turkmen State Medical Institute

Ministry of Public Health of Ukrainian SSR
165. Odessa State Medical Institute
166. Chernovitsy Medical Institute
167. Dnepropetrovsk State Medical Institute
168. Crimean State Medical Institute
169. Stalino State Medical Institute

Ministry of Public Health of Kirgiz SSR
170. Kirgiz State Medical Institute

Ministry of Public Health of Kazakh SSR
171. Karaganda Medical Institute

Ministry of Public Health of Tadzhik SSR
172. State Medical Institute of Abu Ali Ibn-Siny (in Abitsenny)

Ministry of Public Health of Uzbek SSR
173. Samarkand State Medical Institute

Ministry of Culture of the U.S.S.R.
174. All-Union State Institute of Cinematography
•175. All-Union Research Institute of Cinematography
176. Leningrad Institute of Cinema Engineering
177. Moscow State Arts Institute
•178. Moscow Academy of Arts of the U.S.S.R.

Ministry of Culture of Russian SFSR
179. Moscow State Library Institute

Ministry of Culture of the Ukrainian SSR
180. Kiev State Conservatory

Ministry of River Transport
181. Odessa Institute of Maritime Engineers
•182. Arctic Research Institute

Ministry of General Machine Building
•183–184. *Secret.*

Ministry of Petroleum Industry of the U.S.S.R.
•185. All-Union Research Institute of Petroleum and Gas Processing and Synthetic Liquid Fuels

Ministry of Defense of the U.S.S.R.
•186–203. *Secret.*

Academy of Pedagogical Sciences of the Russian SFSR
•204. Research Institute of Defectology

Ministry of Education of the Russian SFSR
205. Moscow Regional Pedagogical Institute
206. Iaroslavl State Pedagogical Institute
207. Kazan' State Pedagogical Institute
208. Krasnoiarsk State Pedagogical Institute
209. Kuibyshev State Pedagogical Institute
210. Saratov State Pedagogical Institute
211. Leningrad State Pedagogical Institute

Ministry of Education of the Georgian SSR
212. Tblisi State Pedagogical Institute

Ministry of Education of the Azerbaidzhan SSR
213. Azerbaidzhan State Pedagogical Institute

Ministry of Education of Ukrainian SSR
214. Kiev State Pedagogical Institute

Ministry of Education of the Kazakh SSR
215. Alma-Ata State Pedagogical Institute

Ministry of Railroad Transport
•216. All-Union Research Institute of Railroad Transport
217. Moscow Institute of Transportation Economics
218. Khar'kov Institute of Transportation Engineering
219. Tbilisi Institute of Transportation Engineering
220. Dnepropetrovsk Institute of Transportation Engineering

Ministry of Construction of Transportation Facilities
•221. All-Union Research Institute of Construction of Transportation Facilities

Ministry of Radio Industry
•222–224. *Secret.*

Ministry of Fish Industry of the U.S.S.R.
•225. All-Union Research Institute of Lake and River Ichthyology

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Ministry of Construction of Enterprises of Metallurgical and Chemical Industry of the U.S.S.R.

•226. All-Union Research Institute of Water Supply, Sewerage, Hydrotechnical Installations, and Engineering Hydrogeology

Ministry of Shipbuilding

•227–230. *Secret.*

Ministry of Communications of the SSSR

231. Leningrad Electrical Engineering Communications Institute

Ministry of Coal Industry

•232. All-Union Research Institute of Coal Industry

Ministry of Chemical Industry

•233. Research Institute on Fertilization and Insecticides
•234. State Research Institute No. 403

Ministry of Nonferrous Metallurgy

•235. Research and Project Design Institute on Mechanical Processing of Minerals (*Mekhanobr*)
•236. All-Union Research Institute on Aluminum and Magnesium

Ministry of Ferrous Metallurgy

•237. Central Research Institute of Ferrous Metallurgy

Ministry of Electrical Industry

•238. All-Union Electrical Engineering Research Institute
•239. Research Institute No. 627

Ministry of Power Stations

•240. All-Union Power Engineering Research Institute

Chief Administration of Hydro-Meteorological Services of the Council of Ministers of the U.S.S.R.

•241. Central Geophysical Observatory

Moscow City Executive Council

242. Moscow Institute of Urban Construction

State Committee on Physical Culture and Sports of the Council of Ministers of the U.S.S.R.

243. Moscow Institute of Physical Culture (of Lesgaft)
244. Leningrad Institute of Physical Culture

Union of Soviet Writers

245. Literary Institute of Gor'kii

Committee on State Security of the Council of Ministers of the U.S.S.R.

246–(unknown). *Secret.*

PART II.—*List of Soviet higher educational establishments and scientific research institutes accepting both candidate and doctor degree dissertations as of August 1956*[1]

Ministry of Higher Education, U.S.S.R.

1. Azerbaidzhan State University
2. Belorussian State University
3. Vilnius State University
4. Voronezh State University
5. Dnepropetrovsk State University
6. Erivan State University
7. Kazan' State University
8. Kazakh State University
9. Latvian State University
10. Leningrad State University
11. Moscow State University
12. Rostov-on-Don State University
13. Saratov State University
14. Central Asiatic State University
15. Tartu State University
16. Tbilisi State University
17. Tomsk State University
18. First Moscow State Pegagogical

Institute of Foreign Languages

19. Moscow State Institute of Economics
20. Moscow Institute of Engineering and Economics
21. Leningrad Institute of Engineering and Economics
22. Leningrad Institute of Finance and Economics
23. Moscow Institute of Finance
24. Azerbaidzhan Polytechnical Institute
25. Georgian Polytechnical Institute (Tbilisi)
26. Leningrad Polytechnical Institute
27. Central Asiatic Polytechnical Institute (Tashkent)
28. Tomsk Polytechnical Institute
29. Ural Polytechnical Institute (Sverdlovsk)
30. Leningrad Electro-technical Institute
31. Leningrad Institute of Precision Mechanics and Optics
32. Moscow Power Institute
33. Moscow Higher Technical School (MVTU-Bauman Institute)
34. Moscow Institute of Machine Tools
35. Moscow Institute of Physical Engineering and Physics
36. Leningrad Shipbuilding Institute
37. Leningrad Mechanics Institute
38. Moscow Institute of Auto-mechanics
39. Moscow Aviation Institute
40. Kazan' Aviation Institute
41. Leningrad Mining Institute
42. Moscow Geological Surveying Institute
43. Moscow Mining Institute
44. Moscow Oil Institute
45. Sverdlovsk Mining Institute
46. Moscow Peat Institute
47. Moscow Institute of Non-ferrous Metals and Gold
48. Moscow Steel Institute
49. Leningrad Institute of Construction Engineering
50. Moscow Institute of Construction Engineering
51. Moscow Institute of Automobile Highways
52. Moscow Institute of Engineering Geodesy, Aerophoto-Surveying and Cartography
53. Kazan' Chemical Technological Institute
54. Moscow Institute of Precision Chemical Technology
55. Moscow Institute of Chemical Machine Construction
56. Moscow Mendeleev Chemical-Technological Institute
57. Leningrad Lensoviet Technological Institute
58. Moscow Technological Institute of the Food Industry
59. Moscow Technological Institute of the Meat and Dairy Industry
60. Leningrad Technological Institute of the Refrigeration Industry
61. Leningrad Forestry Academy
62. Moscow Forestry Institute
63. Moscow Technological Institute of Light Industry
64. Moscow Textile Institute
65. Moscow Architectural Institute

Ministry of Agriculture, U.S.S.R.

66. Voronezh Agricultural Institute
67. Latvian Agricultural Academy
68. Leningrad Agricultural Institute
69. Omsk Agricultural Institute
70. Tashkent Agricultural Institute
71. Moscow Institute of Land Exploitation Engineers
72. Moscow Institute for the Mechanization and Electrification of Agriculture
73. Alma-Ata Zooveterinarian Institute
74. Erivan Zooveterinarian Institute
75. Kazan' Veterinarian Institute
76. Leningrad Veterinarian Institute
77. Moscow Veterinarian Institute
78. Omsk Veterinarian Institute

[1] *VyShkoSPR–1957*, pp. 310–14.

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79. Moscow Institute of Water Economy
80. Georgian Agricultural Institute
81. Moscow Timiriazev Agricultural Academy
82. Ukrainian Agricultural Academy
83. Khar'kov Agricultural Institute
84. Khar'kov Veterinarian Institute
85. Kiev Veterinarian Institute
•86. All-Union Scientific-research Institute of Cattle Breeding (VASKhNIL)
•87. All-Union Institute of Experimental Veterinary Science
•88. All-Union Scientific-research Institute of Plant-Growing
•89. All-Union Institute of Helminthology (worm parasites)
•90. All-Union Scientific-research Institute of Fodder

Ministry of Agriculture, Belorussian SSR

•91. Belorussian Scientific-research Institute of Land Exploitation

Ministry of Higher Education Ukrainian SSR

92. Kiev State University
93. L'vov State University
94. Odessa State University
95. Khar'kov State University
96. Kiev Polytechnic Institute
97. L'vov Polytechnic Institute
98. Khar'kov Polytechnic Institute
99. Dnepropetrovsk Metallurgical Institute
100. Kiev Technological Institute of the Food Industry
101. Kiev Engineering-Construction Institute

Academy of Sciences of the U.S.S.R.

•102. Institute of Automation and Remote Control
•103. Institute of Biochemistry
•104. Botanical Institute
•105. Institute of Oriental Studies
•106. Institute of Genetics
•107. Institute of Mining
•108. Institute of Geography
•109. Geological Institute
•110. Institute of Solid Fuels
•111. Zoological Institute
•112. Historical Institute
•113. Institute of the History of Art
•114. Institute of the History of Material Culture
•115. Institute of Russian Literature
•116. Steklov Mathematical Institute
•117. Institute of Machine Utilization
•118. Institute of Metallurgy
•119. Institute of Mechanics
•120. Institute of World Literature
•121. Institute of General and Inorganic Chemistry
•122. Institute of Organic Chemistry
•123. Soil Institute
•124. Institute of Law
•125. Institute of Geo-Chemistry and Analytical Chemistry
•126. Institute of High Molecular Formations
•127. Institute of Linguistics
•128. Institutes of Physics of the Earth, Physics of the Atmosphere, and Applied Geophysics
•129. Physics Institute
•130. Institute of Physiology
•131. Forestry Institute
•132. Institute of Plant Physiology
•133. Institute of Physical Problems
•134. Institute of Physical Chemistry
•135. Institute of Philosophy
•136. Institute of Chemical Physics
•137. Institute of Radio Technology and Electronics
•138. Institute of Microbiology
•139. Institute of Economics
•140. Krzhizhanovskii Power Institute
•141. Institute of Ethnography
•142. Physico-Technical Institute
•143. Paleontology Institute
•144. Radiation Institute
•145. Thermo-Technical Laboratory
•146. Acoustics Institute
•147. Oil Institute
•148. Main Astronomical Observatory
•149. Institute of Oceonography
•150. Institute of Research on Higher Nervous Systems
•151. Institute of Crystallography
•152. Institute of Refrigeration
•153. United Council of the Ural Branch
•154. Institute of the Chemistry of Silicates
•155. Institute of Precision Mechanics and Computer Techniques
•156. Institute of Animal Morphology
•157. Institute of the History and Techniques of Natural Science
•158. Institute of Organic-Element Formations
•159. Institute of Slavonic Studies
•160. Institute of Complex Transportation Problems
•161. Department of Applied Mathematics of the Steklov Mathematical Institute
•162. Institute of the Geology of Ore Deposits, Petrography, Mineralogy and Geo-Chemistry

Academy of Sciences of Azerbaidzhan SSR

•163. Oil Institute

Academy of Sciences of Armenian SSR

•164. Institute of Language and Literature

Academy of Sciences of Belorussian SSR

•165. Department of Physico-Mathematical and Technical Sciences
•166. Institute of Biology

Academy of Sciences of Georgian SSR

•167. Institute of History
•168. Institute of Mathematics
•169. Institute of Linguistics

Academy of Sciences of Kazakh SSR

•170. Institute of Geological Sciences
•171. Institutes of Languages and Literatures and Institute of History, Architecture and Ethnography

Academy of Sciences of Kirgiz SSR

•172. Department of Biological Sciences
•173. Institute of Experimental Medicine

Academy of Sciences of Ukrainian SSR

•174. Department of Biological Sciences
•175. Institute of Physics and Institute of Mathematics
•176. Institutes of Organic and Inorganic Chemistry
•177. Institute of Structural Mechanics
•178. Department of Social Sciences

Academy of Medical Sciences, USSR

•179. Council of the Department of Clinical Medicine
•180. Council of the Medical-Biological Department
•181. Council of the Department of Hygiene, Microbiology and Epidemiology
•182. Institute of Experimental Medicine
•183. Institute of Biophysics

Academy of Pedagogical Sciences, Russian SFSR

•184. Scientific-Research Institute for Teaching Methods
•185. Institute of Psychology
•186. Scientific-Research Institute of Physical Education and School Hygiene
•187. Scientific-Research Institute of the Theory and History of Pedagogy

Institutions of the Central Committee of the Communist Party

188. Higher Party School
•189. Institute of Marxism and Leninism
•190. Academy of Social Sciences

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Ministry of Aircraft Production
•191–193. *Secret*

Ministry of Foreign Trade
•194. Institute of Foreign Trade

Ministry of Geology and Conservation of Mineral Resources, U.S.S.R.
•195. Institute for Geological Scientific Research

Ministry of Health, U.S.S.R.
•196. Central Institute of Medical Improvement
•197. State Scientific-Research Institute for the Study of Microbes and Epidemics of the Southwest

Ministry of Health of Russian SFSR
•198. State Institute for Improvement of Qualifications of Medical Doctors
199. First Leningrad Medical Institute
•200. Central Scientific-Research Roentgen-Radiological Institute
201. Leningrad State Pediatric Institute
202. First Moscow Medical Institute
203. Moscow Institute of Pharmacy
204. Gor'kii Medical Institute
205. Kazan' State Medical Institute
206. Kuibyshev State Medical Institute
207. Leningrad Sanitary-Hygiene Institute
208. Second Moscow State Medical Institute
209. Saratov State Medical Institute
210. Sverdlovsk State Medical Institute
211. Voronezh State Medical Institute
212. Moscow State Stomatological Institute
•213. State Scientific Research Institute of Roentgenology and Radiology
214. Riazan Medical Institute
215. Tomsk State Medical Institute

Ministry of Health of Azerbaidzhan SSR
216. Azerbaidzhan State Medical Institute

Ministry of Health of Belorussian SSR
217. Minsk State Medical Institute

Ministry of Health of Armenia of SSR
218. Erivan Medical Institute

Ministry of Health of Ukrainian SSR
219. Kiev Medical Institute
220. Khar'kov Medical Institute
221. L'vov Medical Institute

Ministry of Health of Kazakh SSR
222. Kazakh Medical Institute

Ministry of Health of Uzbek SSR
223. Tashkent Medical Institute

Ministry of Health of Georgian SSR
224. Tbilisi State Medical Institute

Ministry of Health of Latvia, SSR
225. Riga Medical Institute

Ministry of Foreign Affairs, U.S.S.R.
•226. Moscow State Institute of International Affairs

Ministry of Culture, U.S.S.R.
227. Institute of Painting, Sculpture and Architecture
228. Leningrad State Conservatory
229. State Institute of Theatrical Arts
230. Moscow State Conservatory

Ministry of Urban Economy—Russian SFSR
•231. Academy of Urban Economy

Ministry of Maritime Transport
232. Leningrad Higher Naval Engineering Institute

Ministry of Petroleum Production, U.S.S.R.
•233. All-Union Petroleum Scientific-Research Institute
•234. All-Union Petroleum Scientific-Research Geological Prospecting Institute (VNITRI)
•235. All-Union Institute for Scientific Research in the Geological Prospecting of Petroleum (VNIGNI)

Ministry of Defense Industry and Ministry of Defense
•236–261. *Secret*

Ministry of Education, Russian SFSR
262. Leningrad State Pedagogical Institute
263. Moscow State Pedagogical Institute, named after Potemkin
264. Moscow State Pedagogical Institute, named after Lenin

Ministry of Railroad Transport
265. Leningrad Institute of Railway Transport
266. Moscow Institute of Engineers of Railway Transport

Ministry of River Transport
267. Gor'kii Institute of Engineers of River Transport
268. Leningrad Institute of Engineers of River Transport

Ministry of the Fishing Industry
•269. Moscow Technical Institute of Fish Industry and Economy

Ministry of Radio Industry
•270. *Secret.*

Ministry of Communications, U.S.S.R.
271. Moscow Electro-Technical Institute of Communications

Ministry of Naval Construction
•272. *Secret*

Ministry of Trade, U.S.S.R.
273. Moscow Institute of National Economy

Ministry of Heavy Machinery
•274. Central Scientific-Research Institute of Technology and Machine Construction

Ministry of Chemical Industry
•275. Karpov Physical-Chemical Research Institute

Ministry of Power Stations
•276. All-Union Scientific-Research Institute of Hydrotechnics

Main Administration of the Hydro-Meteorological Service of the Council of Ministers of the U.S.S.R.
•277. Central Institute of Forecasts

State Committee for Construction of the Council of Ministers of the U.S.S.R.
•278. Academy of Construction and Architecture
•279. Central Scientific-Research Institute for Industrial Construction
•280. Scientific-Research Institute of Foundations and Soil Mechanics

State Committee of the Council of Ministers of the Ukrainian SSR for Construction and Architecture
•281. Academy of Construction and Architecture

Committee of Standards, Measures and Measuring Apparatus of the Council of Ministers of the U.S.S.R.
•282. All-Union Scientific-Research Institute of Meteorology

Ministry of Justice of Russian SFSR
•283. Institute of Juridical Sciences

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TABLE V–D–1.—*Number of research establishments in the U.S.S.R. in selected years, 1914–60*

Beginning of year (January)	A Main research institutes	B Branch div. of main res. institutes	C Total (rows A & B)	D Experimental and research stations	E Other research institutes	F Grand total
1914	.....	.....	.....	.....	.....	289
1929	406	32	[a]438	120	705	1,263
1930	[a]400	[a]41	.....	.....	.....	.....
1931	[a]520	[a]102	.....	.....	.....	[d]1,350
1932	[a]860	[a]190	.....	.....	.....	.....
1933	840	188	[a]1,028	334	546	1,908
1934	860	190	.....	[a]336	.....	.....
1935	804	129	.....	.....	.....	.....
1936	797	118	.....	.....	.....	.....
1937	765	102	.....	.....	.....	.....
1938	729	77	.....	.....	.....	.....
1939	694	63	[a]757	[a]416	384	1,557
1940	.....	.....	.....	.....	.....	.....
1941	.....	.....	786	507	528	1,821
.....	.....	.....	.....	.....	.....	.....
1946	.....	.....	914	415	732	2,061
1947	.....	.....	1,005	442	1,001	2,448
1948	.....	.....	1,081	472	1,092	2,645
1949	.....	.....	1,127	573	1,156	2,820
1950	.....	.....	1,156	566	1,083	2,805
1951	.....	.....	1,157	571	1,120	2,848
1952	.....	.....	1,190	586	1,121	2,897
1953	.....	.....	1,192	592	1,081	2,865
1954	.....	.....	1,198	584	1,021	2,803
1955	.....	.....	1,196	580	1,019	2,795
1956	[b]1,064	[b]146	1,210	574	1,013	2,797
1957	.....	.....	1,264	.....	.....	2,756
1958	.....	.....	1,340	.....	.....	2,983
1959	.....	.....	1,482	477	1,238	3,197
1960	.....	.....	1,608	485	1,455	3,548

SOURCES AND NOTES: Data in Cols. A and B for 1914–56 from *Kul't Stroi–1940*, p. 230, except as indicated by footnotes. Data for 1914–56 in Cols. C, D, E, F from *KS–1956*, p. 244, except as indicated by footnotes. Data for 1957–59 in Cols. C and F from *NarKhoz–1959*, p. 842. This latter source also repeats the data for 1929, 1941, 1951, 1954, and 1955. 1959D is also from this source. 1959E derived as a residual. Cols. C–F, 1960, from *NarKhoz–1960*, p. 753.

[a] Figures reported in *Kul't Stroi–1940*, p. 230, check with those in *KS–1956*, p. 244.
[b] *KS–1956*, p. 245.
[c] *Kul't Stroi–1935*, p. 148.
[d] *NarKhoz–1932*, p. 546 (higher education institutes subtracted).

A—Main research institutes.
B—Branch divisions of main research institutes.
C—Cols. A and B combined.
D—*KS–1956*, p. 244, defines it only as "research stations." *Kul't Stroi–1940* gives the definition "agricultural experimental stations, veterinary and animal breeding stations." *Kul't Stroi–1935*, p. 143, defines them as "branch and zonal stations."
E—Includes observatories, institutes of nature and wildlife conservation, state archives and libraries, museums, independent laboratories, *independent* committees (i.e., *not* main research institutes of the academies of sciences), bases and commissions of academies of sciences.

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Appendix to Chapter VI

TABLE VI–A–1.—Aggregate Number of Professionals and Semiprofessionals Employed in the Civilian Economy of the U.S.S.R., Selected Years, 1913–59

TABLE VI–A–2–P.—Soviet Professional Labor Force: Actual Number of Graduate Specialists Employed in the Civilian Economy of the U.S.S.R. by Branch Specialty in Which They Were Trained, 1928–59

TABLE VI–A–2–SP.—Soviet Semiprofessional Labor Force: Actual Number of Technical Specialists Employed in the Civilian Economy of the U.S.S.R. by Branch Specialty in Which They Were Trained, 1928–59

Supplement to Tables VI–A–2–P and VI–A–2–SP (Composition of Soviet Trained Manpower, by Employment, Year End 1928 and 1932)

APPENDIX VI–A–3.—Soviet Professional and Semiprofessional Labor Force: A Comparison of Estimates and Official Reporting of the Absolute Number of Specialists Employed in the Civilian Economy

General Note to Appendix Tables, Series VI–B (Estimating Techniques: Attrition Rates and Projections of the Number of Specialists Employed in the National Economy)

TABLE VI–B–1.—Number, Graduates and Estimated Annual Attrition Rates for Soviet Professionals and Semiprofessionals in All Fields Employed in the National Economy of the U.S.S.R., 1954–59

TABLE VI–B–2–P.—Soviet Professional Labor Force: Supply, Graduates and Attrition Rates, 1955–56

TABLE VI–B–2–SP.—Soviet Semiprofessional Labor Force: Supply, Graduates and Attrition Rates, 1955–56

TABLE VI–B–3–P.—Soviet Professional Labor Force: Supply, Graduates and Attrition Rates, 1956–57

TABLE VI–B–3–SP.—Soviet Semiprofessional Labor Force: Supply, Graduates and Attrition Rates, 1956–57

TABLE VI–B–4–P.—Soviet Professional Labor Force: Supply, Graduates and Projection of the Number Employed, 1957–60, 1965

TABLE VI–B–4–SP.—Soviet Semiprofessional Labor Force: Supply, Graduates and Projection of the Number Employed, 1957–60, 1965

TABLE VI–B–5–P.—Soviet Professional Labor Force: Supply, Graduates and Attrition Rates, 1957–59

TABLE VI–B–5–SP—Soviet Semiprofessional Labor Force: Supply, Graduates and Attrition Rates, 1957–59

General Note to Appendix Tables, Series VI–C.

TABLE VI–C–1–P.—Supply and Employment of Higher Education Graduates in the U.S.S.R. as of January 1, 1941

TABLE VI–C–2–P.—Supply and Employment of Higher Education Graduates in the U.S.S.R. as of December 1, 1956

TABLE VI–C–3–P.—Supply and Employment of Higher Education Graduates in the U.S.S.R. as of December 1, 1957

TABLE VI–C–4–P.—Supply and Employment of Higher Education Graduates in the Ukrainian SSR as of December 1, 1956

TABLE VI–C–5–P.—Supply and Employment of Higher Education Graduates in the U.S.S.R. as of December 1, 1959

TABLE VI–C–1–SP.—Supply and Employment of Semiprofessional Graduates in the U.S.S.R. as of January 1, 1941

TABLE VI–C–2–SP.—Supply and Employment of Semiprofessional Graduates in the U.S.S.R. as of December 1, 1956

TABLE VI–C–3–SP.—Supply and Employment of Semiprofessional Graduates in the U.S.S.R. as of December 1, 1957

TABLE VI–C–4–SP.—Supply and Employment of Semiprofessional Graduates in the Ukrainian SSR as of December 1, 1956

TABLE VI–C–5–SP.—Supply and Employment of Semiprofessional Graduates in the U.S.S.R. as of December 1, 1959

TABLE VI–US–1.—Total Number of Employed Persons in the U. S. by Major Industry Group, Occupation Group and Sex, as of April 1950

TABLE VI–US–2.—Experienced U. S. Civilian Labor Force of Employed Persons 14 Years of Age and Over and Persons with Four or More

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Years of College Education, by Major Occupation Group, as of April 1950.

TABLE VI–US–3.—Estimated Number of Persons Employed in the U. S. with Four or More Years of College Education by Major Industry Group, Occupation Group and Sex, as of April 1950

TABLE VI–US–4.—Number and Ratio of Persons with Four or More Years of College Education among Selected Engineering and Scientific Occupations in the United States, by Sex, as of April 1950

APPENDIX VI–Q.—Comparison of Soviet and United States Reporting of Industry Sectors

APPENDIX VI–W.—Quotations of Monthly Wage Scales and Index of Wages for Various Occupations of Soviet Workers and Salaried Employees

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TABLE VI–A–1.—*Aggregate number of professionals and semiprofessionals employed in the civilian economy of the U.S.S.R., selected years, 1913–59*

[In thousands]

Date and type of reporting	Professionals with completed higher education	Semiprofessionals with secondary specialized education	Total trained specialists	Source note
Year end 1913	136.0	34.0	190.0	AA
January 1928 (*TsSU*, actual figures, 1957 reporting)	233.0	288.0	521.0	A
Year end 1929 (estimate in *SPM* on basis of *Gosplan* reporting)	(283.5)	.....	.....	B
Year end 1932 (*Gosplan*, actual figures)	462.4	903.7	1,366.1	C
Year end 1937 (*Gosplan*, actual figures)	748.8	1,440.0	2,188.8	D
Year end 1940 (estimate in *SPM* on the basis of a variety of sources)	(850.0 to 900.0)	(1650.0 to 1700.0)	(c. 2550.0)	E
January 1, 1941 (*TsSU*, actual figures, 1956 reporting)	908.0	1,492.2	2,400.2	F
Year end 1946 (official statement)	.....	.....	(c. 3000.0)	G
Year end 1948 (estimate in *SPM* on the basis of *Gosplan* percentage increase reporting)	.....	.....	(c. 3920.0)	H
Year end 1950 (estimate in *SPM* on basis of *Gosplan* percentage increase reporting)	(1573.0 to 1665.0)	(3015.0 to 3107.0)	(c. 4680.0)	I
Year end 1953 (estimate in *SPM* on basis of *Gosplan* percentage increase reporting)	(1870.0 to 1980.0)	(3870.0 to 3980.0)	(c. 5850.0)	J
Year end 1954 (estimate in *SPM* on basis of *Gosplan* percentage increase reporting)	(c. 2218.0)	(c. 3885.0)	(c. 6103.0)	K
July 1, 1955 (*TsSU*, actual figures, 1956 reporting)	2184.0	2949.1	5133.1	L
January 1 1956 (*TsSU* actual figures, 1956 reporting)	2340.0	3213.0	5553.0	M
December 1, 1956 (*TsSU* actual figures, 1957 reporting)	2633.0	3624.0	6257.0	N
December 1, 1957 (*TsSU*, actual figures, 1958 reporting)	2805.0	4016.0	6821.0	O
December 1, 1958 (*TsSU*, actual figures, 1959 reporting)	3027.0	4449.0	7476.0	P
December 1, 1959 (*TsSU*, actual figures, 1960 reporting)	3236.0	4781.0	8017.0	Q

SOURCES AND NOTES TO TABLE VI–A–1

Row in table — *Sources and Notes*

AA.—*Vestnik statistiki*, No. 5, 1959, p. 80.

A.—*Dos–1957*, p. 257. The source indicates that the figures are "as of 1928." On the basis of an examination of the breakdowns, it appears that the date should have been "end of 1927" or "Jan. 1928."

B.—Estimate presented in *SPM*, p. 343, on the basis of figures given in *Itogi pervogo FYP*, pp. 215–19 and *Plan Kadrov–1930*, p. 104.

C.—*Vtoroi FYP*, pp. 512–13 (also reported in *SPM*, p. 344).

D.—*Tretii FYP*, p. 238 (also reported in *SPM*, p. 345).

F, L.—*NKh–1956*, p. 194.

M.—*NKh–1956*, p. 193.

N.—*Dos–1957*, p. 257.

O.—*SSSR-Tsif–1958*, p. 316. This source also repeats the data for Rows AA, A, F, L and N.

P.—*Vestnik statistiki*, No. 5, 1959, p. 80. This source repeats the data for Rows A, F, L, and O as well.

AA, A, F, L-P, Q.—*NarKhoz–1959*, pp. 102, 673; *NarKhoz–1960*, p. 602.

E, G, H, I, J.—Estimate derived in *SPM*, pp. 345–49, on the basis of Soviet official reporting by the Gosplan of percentage increases in the number of specialists employed in any given year in reference to another year of reporting used as a base. Soviet postwar pronouncements about the number of trained specialists employed in the national economy were as follows (year-end references):

Year	*Reference of increase*	*Source*
1946.....	"Somewhat over 3 million".	*VVSh*, Nos. 11–12, 1946, p. 1 (Kaftanov).
1948.....	155 percent of 1940.....	*Nar Khoz–SBX*, No. 3, p. 413 (Itogi 1948).
1949.....	168 percent of 1940.....	*Nar Khoz–SBX*, No. 3, p. 445 (Itogi 1949).
1950.....	109 percent of 1949.....	*Nar Khoz–SBX*, No. 4, p. 423 (Itogi 1950)
1950.....	184 percent of 1940.....	*Voprosy ekonomiki*, No. 5, 1951, p. 13 (Itogi 1946–50).
1951.....	108 percent of 1950.....	*Voprosy ekonomiki*, No. 2, 1952, p. 11 (Itogi 1951).
1951.....	"Somewhat over 5 million".	*Bol'shevik*, No. 7, 1952, p. 28 (Kulagin article).
1952.....	108 percent of 1951.....	*Pravda* (Malenkov), Oct. 6, 1952.
1952 (fall).	"About 5,500,000" or "about 220 percent of 1940"	*Pravda*, Jan. 23, 1953 (Itogi 1952).
1953.....	108 percent of 1952.....	*Pravda*, Jan. 31, 1954 (Itogi 1953).
1953.....	137 percent of 1949.....	*Pravda*, March 13, 1954 (Saburov speech).
1954.....	109 percent of 1949.....	*Pravda*, Jan. 21, 1955 (Itogi 1954).

These pronouncements have to be elaborated upon and worked out in numerical terms. Then they may be used for checking purposes with various estimates.

In the first place, by using 1952 or 1951 as a base, we can obtain several rough approximations as to the size of the professional and semiprofessional labor force for various years. On the basis of the data stated in the table above, the following derivations can be made:

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1. 1952 (fall) total size was about 5,500,000, which was 2.2 times larger than in 1940, making 1940 about 2,500,000.

2. 1952 total was about 5,500,000, which was 108 percent of 1951, and therefore 1951 total was 5,093,000; 1951 total was 108 percent of 1950 or 4,715,000.

(*a*) 1950 was 184 percent of 1940; consequently 1940 was 2,562,000.

(*b*) 1950 total was 109 percent of 1949 and therefore 1949 total was 4,325,000; 1949 total was 168 percent of 1940, making 1940 total 2,574,000.

3. Total size in 1951 was about 5 million, which was 108 percent of 1950 and 1950 therefore was about 4,630,000.

(*a*) 1950 total was 184 percent of 1940; consequently 1940 was 2,516,000.

(*b*) 1950 total was 109 percent of 1949 and therefore 1949 total was 4,248,000; 1949 total was 168 percent of 1940, giving 2,528,000 for 1940.

4. 1951 total was about 5 million, which was 108 percent of 1950, thus 1950 was about 4,630,000; 1950 total was 109 percent of 1949, and therefore 1949 total was 4,248,000. 1953 total was 137 percent of 1949, and therefore 1953 total was 5,820,000.

5. 1952 total was about 5.5 million, 1953 total was 108 percent of 1952 or 5,940,000; 1953 total was 137 percent of 1949 total, and therefore 1949 total was 4,336,000. 1949 total is 168 percent of 1940, and consequently 1940 total is about 2,580,000.

6. 1951 total was about 5 million; 1952 total was 108 percent of 1951 total, making 1952 total 5.4 million; 1953 total was 108 percent of 1952 total, or 5,832,000; 1953 total was 137 percent of 1949 total, and therefore 1949 total was 4,257,000. 1949 total is 168 percent of 1940, making 1940 total 2,534,000.

7. 1948 total was 155 percent of 1940; consequently—

(*a*) Assuming 1940 as 2,500,000, 1948 total was 3,875,000.

(*b*) Assuming 1940 as 2,550,000, 1948 total was 3,952,00.

8. 1954 total was 109 percent of 1953; consequently assuming 1953 total as about 5,820,000, we obtain 1954 total of 6,345,000.

All these computations indicate that, although none of the figures coincides for a given year and they all show differences depending on the way in which they were derived, nevertheless, from official pronouncements rough approximations can be obtained about the size of the Soviet professional and semiprofessional labor force combined. The variation is obviously due to the rounding of both base figures for 1952 and 1951 and reported percentage increases. Despite this, the figures for the following years can be accepted as rough approximations:

Year end	*Set of estimated figures*			*Approximate total*
1940	2,500,000;	2,562,000;	2,574,000;	
	2,580,000;	2,528,000;	2,534,000	c. 2,550,000
1946		—		c. 3,000,000
1948	3,875,000;	3,952,000		c. 3,920,000
1949	4,325,000;	4,248,000;	4,336,000;	
	4,257,000			c. 4,270,000
1950	4,715,000;	4,630,000		c. 4,680,000
1951		—		c. 5,000,000
1952		—		c. 5,500,000
1953	5,820,000;	5,940,000		c. 5,850,000
1954	6,376,000;	6,345,000		c. 6,350,000

In addition to the aggregate number of trained specialists for the years 1940, 1950 and 1953, the distribution of professionals and semiprofessionals can be estimated in the following way.

For 1940 one Soviet source (*VVSh*, No. 10, 1946, p. 4) gives the following figures on workers and employees in the national economy per trained specialist:

1. In 1940 there were 36 workers and employees per each professional with completed higher education.

2. In 1940 there were 21 workers and employees per each semiprofessional with completed secondary specialized education.

3. In 1940 there were 13 workers and employees per each trained professional and semiprofessional combined with completed higher and secondary specialized education, respectively.

Since there is no indication as to whether these figures refer to year end, average annual, or the January 1 reporting of the nonagricultural labor force of Soviet workers and salaried employees employed in the national economy, it is impossible to be certain which employment figures should be used in reconstruction. Therefore the following estimates were made:

Version I. Assuming the 1940 (Jan. 1) nonagricultural labor force as 30 million (W. Eason in A. Bergson (ed.), *Soviet Economic Growth*, p. 110):

	Thousands
1. Estimate of number of professionals	833
2. Estimate of number of semiprofessionals	1,429
3. Total	2,262
4. Estimate of number of professionals and semiprofessionals combined	2,308

Version II. Assuming the 1940 (average annual) nonagricultural labor force as 31.2 million [*idem*]:

1. Estimate of number of professionals	866
2. Estimate of number of semiprofessionals	1,486
3. Total	2,352
4. Estimate of number of professionals and semiprofessionals combined	2,400

Version III. Assuming the 1940 (year end, i.e., Jan. 1, 1941) nonagricultural labor force as 31,500,000 [*idem*]:

1. Estimate of number of professionals	875
2. Estimate of number of semiprofessionals	1,500
3. Total	2,375
4. Estimate of number of professionals and semiprofessionals combined	2,423

The discrepancies are obviously due to rounding of both figures on workers and employees and number of workers and employees per one specialist of any given level. There is admittedly no precision in such estimates, but it seems most likely that the figures refer to the beginning of the year. If we assume that the 1940 (year end) number of specialists was about 2,550,000 and that graduations of specialists in 1940 were about 320,000, then the figure for 1939 (year end, i.e., Jan. 1, 1940) should have been somewhat above 2,230,000 (without accounting for attrition), or about the same as in Version I above. Consequently, there is a probability that the figures stated do refer to January 1940 rather than to the end of that year.

Regardless of these discrepancies and uncertainty as to the date of reporting, on the basis of these data it is possible to ascertain that by 1940 the labor force of trained specialists consisted of 33 to 35 percent professionals with higher education and 67 to 65 percent semiprofessionals with secondary specialized education. Applying this ratio, there were, by 1940, 850,000–900,000 professionals and 1,650,000–1,700,000 semiprofessionals.

Another significant statement about the professional labor force relates to this estimate of professionals with completed higher education from among all trained specialists. One source (Zhirnov, *Kul'turnoe*, p. 23) states that just before the beginning of the war in 1941, the number of professionals employed in the national economy was "almost 1 million." Since graduations in 1941 were about 100,000, the 1940 total number of professionals employed was less than 900,000, or about the same as indicated in the reconstruction presented above.

For 1950 one source (F. Koshelev, *Pod'em material'nogo i kul'turnogo urovnia zhizni sovetskogo naroda*, Moscow, 1954, p. 40) states that between 1940 and 1950 the total trained labor force (number of employed specialists) increased by 84 percent, and that the number of professionals increased by 85 percent. The first part of this statement confirms the relationship utilized for the estimates above that the 1940 total trained labor force was about 2,550,000 and in 1950 was about 4,680,000:

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[in thousands]

	1940 Version (a)	1940 Version (b)	1950 Version (a)	1950 Version (b)
Professionals	850	900	1,573	1,665
Semiprofessionals	1,700	1,650	3,107	3,015
Total trained labor force	2,550	2,550	4,680	4,680

For 1953 one source (*VVSh*, No. 10, 1954, p. 1) states that the number of professionals with higher education employed in the national economy increased between 1940 and the end of 1953 by 220 percent. Assuming the 1940 composition, we obtain the following composition of professional and semiprofessional labor force, depending upon which assumed distribution for 1940 is taken:

[in thousands]

	1940 Version (a)	1940 Version (b)	1950 Version (a)	1950 Version (b)
Professionals	850	900	1,870	1,980
Semiprofessionals	1,700	1,650	3,980	3,870
Total trained labor force	2,550	2,550	5,850	5,850

Note: All these estimates were made before data in absolute numerical terms were officially released in 1956. In retrospect, therefore, the estimate of the number of professionals in the Soviet economy seems to be sufficiently accurate (*SPM* estimate, 850–900,000; 1956 official reporting, 908,000). The number of semiprofessionals was overestimated by 150-200,000 (*SPM* estimate, 1,650,000–1,700,000; 1956 official reporting, 1,492,000). The most likely explanation of this latter difference is that a large number of semiprofessionals withdrew from the labor force for further training or to serve in the armed forces.

TABLE VI–A–2–P.—*Soviet professional labor force: actual number of graduate specialists employed in the civilian economy of the U.S.S.R. by branch specialty in which they were trained, 1928–59*

[in thousands]

Branch	Jan. 1928	Year end 1937	*SPM* estimate year end 1940	Jan. 1 1941	*SPM* estimate year end 1954	July 1 1955	Dec. 1 1956	Dec. 1 1957	Dec. 1 1959
	A	B	C	D	E	F	G	H	I
1. Engineering-industrial	47.0	262.2	(283.5)	289.9	(541.0)	585.9	720.9	816.1	986.6
2. Agricultural	28.0	89.5	(97.3)	69.6	(189.0)	158.7	179.5	193.1	222.4
3. Socioeconomic	26.0	60.2	(61.7)	80.2	(125.0)	160.9	197.7	215.3	259.4
a. Economics, planning and merchandising	13.0	.....	.....	59.3	.....	113.8	141.2	157.5	193.9
b. Jurisprudence	13.0	.....	.....	20.9	.....	47.1	56.5	57.8	65.5
4. Educational-cultural	59.0	231.0	(284.1)	300.4	(857.0)	906.4	1116.6	1144.9	1278.9
5. Health	63.0	105.9	(121.6)	140.8	(324.0)	299.0	329.4	346.0	378.6
Total, 1–5	223.0	748.8	(848.2)	880.9	(2036.0)	2110.9	2544.1	2715.4	3125.9
Undistributed residual	10.0	.....	(57.8)	27.1	(182.0)	73.1	87.1	90.1	109.8
Grand total	233.0	748.8	(906.0)	908.0	(2218.0)	2184.0	2631.2	2805.5	3235.7

TABLE VI–2–SP.—*Soviet semiprofessional labor force: actual number of technical specialists employed in the civilian economy of the U.S.S.R. by branch specialty in which they were trained, 1928–59*

[in thousands]

Branch	Jan. 1928	Year end 1937	*SPM* estimate year end 1940	Jan. 1 1941	*SPM* estimate year end 1954	July 1 1955	Dec. 1 1956	Dec. 1 1957	Dec. 1 1959
	A	B	C	D	E	F	G	H	I
1. Engineering-industrial	51.0	372.3	(413.5)	320.1	na	804.9	1049.7	1257.0	1679.5
2. Agricultural	31.0	145.5	(191.7)	92.8	na	254.4	295.4	310.0	360.7
3. Socioeconomic	8.0	184.6	(174.9)	42.4	na	209.3	274.8	314.0	405.7
a. Economics, planning and merchandising	6.0	.....	.....	36.2	na	186.1	251.8	294.0	387.6
b. Jurisprudence	2.0	.....	.....	6.2	na	23.2	23.0	20.0	18.1
4. Educational-cultural	137.0	524.3	(618.9)	536.4	na	818.6	934.1	971.0	1018.4
5. Health	48.0	213.3	(370.6)	393.2	na	731.1	900.2	980.0	1119.7
Total, 1–5	275.0	1440.0	(1769.6)	1384.9	na	2818.3	3454.2	3832.0	4584.0
Undistributed residual	13.0	.....	.....	107.3	na	130.8	167.4	184.0	197.1
Grand Total	288.0	1440.0	(1769.6)	1492.2	3885.0	2949.1	3621.6	4016.0	4781.1

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SOURCES AND NOTES TO TABLE VI–A–2–P

Column — *Sources and Notes*

A.—*Dos–1957*, p. 258; *SSSR-Tsif–1958*, p. 316.

B.—*Tretii FYP*, p. 238.

C.—Estimate from *SPM*, p. 361, derived as follows (Version P):

[in thousands]

	(M)	(N)	(O)	(P)
Engineering	351.2	333.9	317.3	285.5
Agricultural	120.5	114.6	108.9	97.3
Socioeconomic	76.8	72.9	69.1	61.3
Educational	349.1	333.2	317.9	284.1
Health	149.9	142.7	136.1	121.6
Total	1,047.5	997.3	949.3	848.2

(M) Derived by method of straight addition of graduating classes to the assumed 1937 distribution of employed specialists.

(N) Derived by method of assumed 2 percent average annual attrition rate using 1937 as a base.

(O) Derived by the method of assumed 4 percent average annual losses using 1937 as a base.

(P) Derived by method of assumed 2 percent average annual losses using 1937 as a base and making a downward adjustment for prewar withdrawal (100,000) of professionals from civilian employment (i.e., draft, incarceration, etc.).

Note that party school graduates and extension-correspondence graduates 1938–40 were not included in the distribution. Their total, of 57,800 (adjusted for attrition), is given in the undistributed residual.

D.—*NKh–1956*, p. 194. The same data were repeated in all subsequent statistical handbooks in tables dealing with the employment of specialists.

E.—Estimate derived in *SPM*, p. 363, in the following way:

[in thousands]

	1950	*1951*	*1952*	*1953*	*1954*
Engineering	427.6	447.3	467.6	498.2	541.2
Agricultural	140.1	149.0	160.7	174.5	189.0
Socioeconomic	88.4	98.4	109.2	119.0	124.6
Educational	607.4	674.5	748.3	803.3	857.2
Health	249.1	264.1	290.8	305.9	323.7
All fields	1,512.6	1,633.3	1,776.6	1,900.9	2,035.7
Total, adjusted to include extension graduates	1,512.6	1,680.0	1,864.0	2,027.0	2,218.0

These estimates are derived by the method of assumed 2 percent average annual losses using 1950 as a base. The assumption is made that the 1950 distribution of professionals by field derived below (Version P) is essentially a "true" estimate. The 1950 estimates were as follows:

[in thousands]

	(K)	(L)	(M)	(N)	(O)	(P)	(Q)
Engineering	580.6	485.6	461.4	419.1	388.7	427.6	445.6
Agricultural	192.4	160.0	151.7	134.1	127.1	140.1	146.2
Socioeconomic	121.5	101.2	95.8	84.9	80.4	88.4	92.6
Educational	771.3	665.4	641.2	578.2	557.5	607.4	620.3
Health	321.0	274.2	263.6	236.4	227.7	249.1	254.7
Total	1968.8	1686.4	1613.7	1452.7	1381.4	1512.6	1559.4

(K) Estimated by straight addition of graduating classes to 1937 base.

(L) Estimated by method of 2 percent average annual losses without any adjustment.

(M) Estimated by method of 2 percent average annual losses with assumed 8 percent hypothetical war losses.

(N) Estimated by method of 4 percent average annual losses without any adjustment.

(O) Estimated by method of 4 percent average annual losses with assumed 8 percent hypothetical war losses.

(P) Estimated by method of 2 percent average annual losses with assumed 8 percent hypothetical war losses and with downward adjustment for prewar (1937–40) excessive losses or withdrawals of professionals from civilian labor force.

(Q) Estimated at 3 percent average annual losses without any adjustment for either hypothetical war losses or prewar withdrawals.

Note that the 1950 and 1954 estimates exclude extension-correspondence and party school graduates. The 1954 total of 182,000 (adjusted for attrition) is given in the undistributed residual. The 1950 estimate of professional graduates (Version P) does not appear on Table VI–A–2–P because no comparison is available with the new official releases. See also the further notes and checks on the 1950 and 1954 estimates in *SPM*, pp. 161–63.

F.—*NKh–1956*, p. 194.

G.—*NKh–1957*, p. 209–10; *Dos–1957*, p. 258.

H.—*SSSR-Tsif–1958*, p. 317.

A, D, G, H.—*NarKhoz–1959*, p. 674.

I.—*NarKhoz–1960*, p. 604.

SOURCES AND NOTES TO TABLE VI–A–2–SP

Column — *Sources and Notes*

A.—*Dos–1957*, p. 258; *SSSR-Tsif–1958*, p. 318.

B.—*Tretii FYP*, p. 238.

C.—Estimated in *SPM*, p. 363 (Version N) as follows:

[in thousands]

	(K)	(L)	(M)	(N)
Engineering	484.3	459.8	436.4	413.5
Agricultural	225.5	213.2	203.5	191.7
Socioeconomic	206.1	194.8	183.9	174.9
Educational	723.0	688.5	655.3	618.9
Health	428.8	412.2	396.2	370.6
Total	2,065.7	1,968.5	1,875.3	1,769.6

(K) Derived by the method of straight addition of graduating classes to the assumed 1937 distribution of employed specialists.

(L) Derived by the method of assumed 2 percent average annual attrition rate, using 1937 as a base.

(M) Derived by the method of assumed 4 percent average annual losses, using 1937 as a base.

(N) Derived by the method of assumed 2 percent average annual losses, using 1937 as a base and making a downward adjustment for prewar withdrawal (200,000) of semi-professionals from civilian employment (i.e., draft, incarceration, etc.). It must be noted that despite this adjustment, the total (1,769,600) is still about 70,000 above the estimated total semi-professional labor force. No adjustment was made to account for this difference, since such an adjustment would require further assumptions (i.e., another set of assumptions different from those used in estimates of the professional labor force), and this would complicate even further the estimating technique adopted.

D.—*NKh–1956*, p. 194. The identical data were repeated in all subsequent handbooks released in 1956–60.

E.—Estimated in *SPM*, p. 364. See notes on possible sources of discrepancies and uncertainty of estimating technique in *SPM*, pp. 363–64. The distribution by branch was not available.

F.—*NKh–1956*, p. 194; *NKh–1957*, p. 209.

G.—*NKh–1957*, p. 209; *Dos–1957*, p. 258.

H.—*SSSR-Tsif–1958*, p. 318.

A,D,G,H.—*NarKhoz–1959*, p. 674.

I.—*NarKhoz–1960*, p. 604.

In addition to the data on the number of specialists employed in the national economy presented in Tables VI–A–2–P and VI–A–2–SP, for the years 1928 and 1932 a different type of reporting of specialists employed in the national economy is available in Soviet sources. These data are presented in the supplement below.

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SUPPLEMENT TO TABLES VI–A–2–P AND VI–A–2–SP.—*Composition of Soviet trained manpower, by employment, year end 1928 and 1932*
[in thousands]

Branches	Year end 1928			Year end 1932		
	Professional	Semiprofessional	Total	Professional	Semiprofessional	Total
I. All production, administrative, and exchange branches of national economy	90.0	56.0	146.0	229.2	386.6	615.8
1. Industry, construction, transportation communication	17.9	19.9	37.8	73.6	132.5	206.1
2. Agriculture						
a. Agricultural specialists without administrative functions	9.3	8.5	17.8	36.3	58.5	94.8
3. Administrative, government, and exchange	62.8	27.6	90.4	119.3	195.6	314.9
a. Socioeconomic segment only						
II. Educational-cultural	[a](130.0)	.....	.....	156.9	382.1	539.0
1. Primary- and secondary-school teachers	26.0	185.5	211.5	43.2	344.0	387.2
2. Higher education teachers	[b](10.4)	.....	.....	.....	.....	.....
III. Health	63.5	72.0	135.5	76.3	135.0	211.3
1. Medical personnel only	.....	.....	.....	.....	.....	.....
Total	[c](283.5)	.....	.....	462.4	903.7	1,366.1

SOURCES AND NOTES TO SUPPLEMENT TO TABLES VI–A–2–P AND VI–A–2–SP

[a]In this segment in 1932 there were about 155,000 (see Table IV–A–1–G) persons. Since about 30,000 graduated during the 5-year period, there were about 130,000 "educational-cultural" specialists in 1928.

[b]*Plan kadrov–1930*, p. 104.

[c]By addition of I, II, III, where II is an estimate.

All figures for 1928 except those in parentheses are from *Itogi pervogo FYP*, pp. 215–19, 275. The source does not give full coverage of all trained specialists employed. Productive branches in engineering and in agricultural are singled out, but administrative employment of trained specialists is not given by segment.

All figures for 1932 from *Vtoroi FYP*, pp. 512–13. This table is compiled from Gosplan reporting with full coverage. Administrative personnel (I–3) is singled out from all productive branches of the national economy and is not distributed by field.

The total of 1,366,000 trained specialists constitutes about 50 percent of all specialists employed in the national economy (2,737,000).

APPENDIX VI–A–3.—*Soviet Professional and Semiprofessional Labor Force: A Comparison of Estimates and Official Reporting of the Absolute Number of Specialists Employed in the Civilian Economy*

1. *Professional Labor Force Estimate*

In the appendix to Chapter VI, Tables VI–A–1, VI–A–2–P and VI–A–2–SP present information concerning the supply of specialized manpower employed in the Soviet civilian economy. The data in these tables are of two types: figures stated directly in absolute terms and estimates based on Soviet official releases, which during the years shortly prior to World War II, during its course, and for eleven years afterwards were cast almost exclusively in the enigmatic lingo of "percentage increase." This propagandistically oriented "percentage" game which the Soviet statistical agencies were playing was the product of two dichotomous objectives. One was official secrecy, which wanted to conceal the actual magnitudes of various economic indices (including the supply of trained manpower). The other was a drive to "impress" the Soviet population and the world at large by boastful claims that the Soviet Union was making continuing advances. Among other things, the percentages tried to conceal the devastation and losses of manpower caused by World War II and by political purges in the late 1930's. On the other hand, they always made for favorable comparisons between past and present.

In 1956 and 1957 the ice was broken somewhat, mainly for propagandistic reasons (the celebration of the Fortieth anniversary of the October Revolution), and partly because of the desire to straighten out some of the statistical series. in 1956–60 the release of a large number of statistical handbooks

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by the Soviet Union's Central Statistical Administration (TsSU) took place. To a large measure the information which they contained was not drastically different from what was already known, though the handbooks did summarize data in a more convenient fashion and also presented, in a sense, "firm" official figures. Much of the really significant information (for instance, detailed employment statistics, wage or price data) was still kept secret. But in regard to trained professional and semiprofessional manpower, and especially education, a number of "firm" figures (instead of percentages) and previously unavailable statistics were released.

In the course of the preparation of the earlier study, *Soviet Professional Manpower–Its Education, Training and Supply* (*SPM*), many estimates were made, based on the earlier practice of Soviet reporting. A continuing effort was made then to "open" the Soviet pronouncements cast in percentage terms and wrest from them whatever meaningful statistical information they might contain. In regard to the stock of professional and semiprofessional manpower, it is important to compare now the earlier estimates with the absolute figures released currently (1956–60) by the Soviet Government.

In regard to the quantitative aspects of supply of Soviet graduates with completed higher education, the following observations can be made. *NKh –1956* (p. 194) gives data on the number of Soviet professionals by field employed in the national economy as of January 1, 1941 (presented in Col. D, Table VI–A–2–P) and July 1, 1955 (Col. F, Table VI–A–2–P). Subsequently, other statistical handbooks (*NKh–1957,* pp. 209–10; *Dos–1957,* p. 258; *SSSR-Tsif–1958,* p. 319) repeated the same figures. The corresponding figures for these two years, Col. C and Col. E of Table VI–A–2–P, can be compared with the estimates in *SPM,* p. 239, as of year end 1940 and year end 1954. This is done in Table VI–A–2–P above. This comparison requires several comments.

First, it ought to be noted that in regard to professional manpower any differences between the absolute figures in the current official releases and the estimates in *SPM* are minor. The totals coincide quite closely. The figures on the supply of professional specialists in individual branches diverge, but in most cases the differences are well under 5 percent. It should be noted that the *SPM* estimates, though using Soviet statistics on annual graduations and applying them to a base year reporting of the number of professionals employed, made reliance upon independently estimated attrition rates. In other words, the *SPM* estimates relied largely upon detailed graduation statistics and empirical or hypothetically assumed rates of attrition (or losses). The professional labor force estimates were then checked against the percentage reporting issued by the State Planning Commission (*Gosplan*).

For the year 1940 the *SPM* estimate was based on the *exclusion* of Communist Party school graduates (about 58 thous.) and extension-correspondence graduates (about 25,000) during the pre-war period. If these are included (their discounted total in "undistributed residual", Col. C, Table VI–A–2–P), the estimated total is almost identical to the official total. The inclusion of these categories if redistributed (among branches 1–5) would affect primarily the education and socioeconomic branches, which in the *SPM* estimates are now lower than in official breakdowns.

In the official reporting for 1941 (Col. D) there appears a residual category which is not explained. But what is particularly worth noting is that official reporting for the socioeconomic field is probably based on the *inclusion* of economists and jurisprudence specialists from other fields (i.e., they are subtracted from education and other fields as is done with the graduates). This is not the case with the estimates in *SPM,* where economist or jurisprudence specialists graduating from universities were counted in the educational-cultural branch. The number of professionals in the medical field in official statistics is larger, by about 19,000 than the *SPM* estimate, and there is no ready explanation why this is the case for 1940. The new official figures do not provide any clues as to the old question of where the engineers on the mechanization and electrification of agriculture are included.

Turning to a comparison of the professional labor force in official reporting for 1955 and *SPM* estimates for year-end 1954, we observe that there are only minor differences in the totals. The estimates in *SPM* for professionals by field were based on the exclusion of extension-correspondence graduates. The total number of these graduates, after discounting for attrition, is 182,000, and if it is distributed this would increase the figures in the education and socioeconomic fields primarily (and these estimates for the education and socioeconomic fields primarily (and these estimates for the education and socio-economic fields are now lower than the figures reported officially). With the inclusion of extension-correspondence graduates, the grand totals show a discrepancy of only 2 percent. The problem of the reallocation of socioeconomic field professionals is identically the same as discussed above for 1940. The official figures contain an undistributed residual, which again is not explained. *SPM* overestimates by 10 percent the the number of medical-health field professionals (because the estimate of medical field graduates was higher than was warranted), see Supplement to Table IV–A–1–G.

What is important to note, furthermore, is that *NKh* and *NarKhoz* statistics refer to the *actual number of professionals employed by field, which*

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is defined on the basis of their former training. This in turn is essentially an identical definition with that which was followed in the course of estimating in *SPM*. In other words, it can be argued that the validity of the estimating technique as such remains unchallenged. Of course, neither this type of official statistic nor the estimates in *SPM* reveal the employment pattern from the point of view of acual on-the-job occupations, but this is an entirely different problem which will be discussed in another part of this appendix (see the tables of the "VI–B" series) and in the text (Chapter VI). All that is important to say at this point is that despite numerical differences, the estimating technique employed in *SPM* remains valid.

Whatever differences there are between the official figures and the estimates and no matter how we search for them and try to explain them, it must be admitted also that their exact nature and causes cannot be ascertained, although the quantitative differences are obvious. Comparisons of this type are useful, however, primarily in that they help somewhat in understanding the categories of reporting Soviet professionals by field. As social statistics of this type are valid as approximations only, these comparisons confirm the overall usefulness of the estimating technique employed in *SPM* in regard to professionals as being sufficiently reliable.

2. *Semiprofessional Labor Force Estimates*

As we turn from professional manpower to the semiprofessional labor force, the comparisons of the newly released (1956–60) official statistics and the estimates obtained in *SPM* become quite disheartening. It must be emphasized again (see Sources and Notes to Tables III–A–1–A, –E, and –G) that the paucity of Soviet statistics prior to the publication of the new statistical handbooks made for enormous difficulties in ascertaining reliable numerical trends for semiprofessional graduates and their employment in the national economy of the U.S.S.R. Tables VI–A–1 and VI–A–2–SP above have summarized official data released in the new statistical handbooks (*NKh–1956; NKh–1957; Dos–1957; SSSR–Tsif–1958; NarKhoz–1959; NarKhoz–1960*), as well as the estimates in *SPM* as to the total size and distribution by field of semiprofessionals employed in the national economy of the U.S.S.R.

The first observation about the comparison of *SPM* estimates with Soviet official data is that there is a very sizeable discrepancy for both the 1940 (Rows E and F of Table VI–A–1 and the "grand total" in Cols. C and D of Table VI–A–2–SP) and the 1954 (Rows K and L of Table VI–A–1 and the "grand total" in Cols. E and F of Table VI–A–2–SP) totals. In 1940 the estimated and official totals differ by 175,000 to 260,000, but in 1954 this difference in totals is 936,000, which constitutes about *one-third* of all semiprofessionals employed in the national economy of the U.S.S.R. This very sizeable difference makes the estimates look very inefficient indeed. This difference is most peculiar, especially if we take into consideration the quite satisfactory estimates in *SPM* for Soviet professionals.

At the time that *SPM* was being prepared, graduation data on Soviet semiprofessionals was poor to the extent that estimates of the semiprofessional labor force by field were terminated in 1952 and thus stopped short of 1954. The estimate for totals was made (*SPM*, p. 364), but we do not have any estimates in *SPM* to compare with official figures by field except for 1940. For that year the number of semiprofessionals by field differs also significantly from the officially reported figures.

The substantial differences between the official figures and the estimates in *SPM* are most likely due to the following factors. The first is that during World War II semiprofessionals apparently *suffered substantially higher losses* than the 8 percent assumed hypothetically in *SPM*. The assumed 8 percent hypothetical war losses were a sufficiently good approximation for professionals, but they were far too low for semiprofessionals. Semiprofessionals even in peacetime are neither exempt nor deferred from military service as is the case with Soviet higher education students and graduates. During the war they certainly did not have preferential status as far as mobilization was concerned, as was the case with some categories of professionals (engineers, scientists and even medical doctors), who were at times exempt from service under the provision of *bron'* (indefinite deferment from military service because the civilian job or activity is considered essential for defense).

A second factor which could explain the difference is as follows. There was sufficiently good information to run independent estimates of Soviet professional manpower by field and for totals for most years. This was not true of semiprofessionals. As a result, *SPM* relied extensively on the following estimating technique. After the total number of professionals and semiprofessionals combined (i.e., "Total Trained Specialists" column in Table VI–A–1) had been estimated, the independently derived professional component (i.e., sufficiently "good" estimate) among all specialists was subtracted in order to obtain the number of semiprofessionals. Thus semiprofessionals were often estimated as a "residual." But if the rates for war losses and annual attrition for semiprofessionals were higher than for professionals, then the estimates derived by such a technique result in figures for semiprofessionals which are biased upwards. Now, in retrospect, it seems certain that this was the case.

The third reason is a very complicated one. In a sense it could be called a deliberate "deceit" on the part of official Soviet reporting. It deals with complicated statistical procedures and the problem has to be stated most carefully. Soviet professional

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manpower could be estimated on the basis of certain totals and fairly detailed data on annual graduations. This is in effect an independent estimate of the size of the professional labor force in a certain year and we should not worry about it for the moment.

Around 1948 Soviet official sources introduced in their reporting (mostly the Gosplan and Central Statistical Administration annual reports) a reference to "relatives" as to the total size of professional and semiprofessional manpower *combined* employed in a certain year as compared with employment in another year in the past (usually the preceding year or a pre-war year). Using these relatives, one could estimate the *total* size of professional and semiprofessional manpower. Most of the reported "relatives," when converted to absolute numbers, apparently resulted in internally "consistent" estimates. These estimates were presented in *SPM* and for comparative purposes have been included in Tables VI–A–1, VI–A–2–P and VI–A–2–SP of the present study. After the appearance of the official handbooks, these original "relatives" were applied to the 1940 (now officially reported) base, and subsequent estimates were obtained.

Reconstruction of post-war totals of professionals and semiprofessionals combined on the basis of reported percentage relatives is as follows:

Year end reporting of percent inceases[a]	*Estimated Figures* *On the 1940 base*	*On the base of other years*
Officially reported as actually employed on Jan. 1, 1941[b]	2,400,000[b]	
1948 155% of 1940	3,720,000	
1949 168% of 1940	4,032,000	
1950 109% of 1949		4,395,000
1950 184% of 1940	4,416,000	
1951 108% of 1950		4,747,000
1952 108% of 1951		5,127,000
1952 220% of 1940	5,280,000	
1953 108% of 1952		5,537,000
1953 137% of 1949		5,523,000
1954 109% of 1953		6,035,000
1955 111% of 1954[c]		6,699,000
Officially reported as actually employed on Jan. 1, 1956[b]		5,553,000[b]

These computations represent the same estimating procedures as those used in *SPM;* however, they use the official (1940) base. These computations produce a total which is *strikingly divergent, by 1,146,000, from that officially reported for the year end 1955.* Officially we have an employment of 5,553,000, and using Soviet official annual reporting in percentage terms, we get 6,699,000 for the year end 1955. This enormous discrepancy casts serious doubts as to whether the Gosplan's annual announcements of percentage gains over some base year can be used as a reliable indicator of growth and requires further explanation.

[a] All percents reported are the same as those reproduced in *SPM*, p. 345 (see sources and Notes to Table VI–A–1).
[b] *NKh–1956*, p. 193.
[c] *Pravda*, Jan. 30, 1956 (Itogi 1956).

The first reason that this discrepancy occurs is the very likely probability that Soviet authorities were indeed making fraudulent statements in trying to conceal their war losses, and sometime in the post-war period derived an "estimate" which minimized their actual war losses and was substantially higher than the actual number of specialists employed in the national economy. Once this had happened, they got "stuck" with a very large "base" for one of the early post-war years and continued to use it for annual reporting. Though this is likely, there is also another possibility.

This possibility is that when Soviet official pronouncements (mostly by the Gosplan or the State Statistical Administration in regard to the fulfillments of annual plans) stated the percentage of an increase in the total number of specialists (professionals and semiprofessionals combined) in any given year as compared with a previous year, they referred *not* to the *actual* increase of employment of specialists, but to the number of graduates on both levels in a certain year. This would have increased the total employment of specialists in the national economy by a certain percentage, which was obtained, however, by disregarding the actual attrition and losses during the year altogether or by making only certain small (totally insufficient) "anticipated," "planned" or "estimated" allowances for such attrition and losses. In the latter case, the allowance made was so small that each year kept on piling up otherwise unjustified increases. In other words, when Soviet sources stated that the number of specialists in the year so and so was 8 percent higher than a year earlier, they quite likely meant the total number of graduates (both professional and semiprofessional) during that year as a percent of the previous year's total. "Last year's total" was also an estimate chained to the preceding year, etc. In this way the original error and each subsequent year's error kept on inflating the totals. This is an appealing interpretation, for it is still not certain whether the Central Statistical Administration or the Gosplan actually *counts* (makes surveys) or just "estimates" the number of graduates employed in the national economy at the beginning, middle or end of any given calendar year. There are very strong reasons to suspect that Soviet statistical authorities "estimate" rather than actually count professionals and semiprofessionals by field of formal training.

It could also have happened that each year Soviet authorities continued to "upgrade" a certain number of persons who had passed "courses" or taken some other equivalent training thus advancing from the status of semiprofessional to the status of professional. By such upgrading they would have been able to show higher percentage increases in the annual rates of employment of specialists. Then when they came to the business of writing the official handbook, they realized that there were

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"too many" such upgraded people and simply decided to make a more rigorous definition.

In connection with the two latter points, it appears likely that Soviet authorities did not make allowance for the withdrawal of semiprofessionals for further training in higher education. In other words, on whatever system Soviet official reporting was based (estimate or actual count), it *double-counted* those semiprofessionals who meanwhile had either already become professionals or else had withdrawn each year to continue training in Soviet higher education. This could easily account for anywhere from 5 to 15 percent of the total number of higher education graduates, or anywhere from 100,000 to 300,000. This figure is still not enough to account for the main cause of the observed discrepancy. The *SPM* estimates did not make any allowance for withdrawals of semiprofessionals to continue education. One wonders whether Soviet authorities themselves were consistent in making such allowances. This might easily have resulted in double counting of the same persons, once as semiprofessionals and again as professionals several years later (thus *not* cancelling out in the total count a person who, after proper training, became a professional but was once only a semiprofessional).

Finally, it is conceivable that the military establishment absorbs annually some (and just prior to the war and in the course of the war, it was many) semiprofessionals trained for civilian employment. Semiprofessionals who do not enjoy deferment from military service might conceivably be "caught" by the military draft much more frequently than professionals. If, as is likely, this is the case, then obviously during the war semiprofessionals might suffer losses substantially higher than other components of trained manpower, namely the professionals.

Whatever the case may be, the most significant finding on the basis of the new statistical materials in regard to the semiprofessionals is that losses and withdrawals of semiprofessionals from the labor force are substantially higher than for professionals. Now the attrition rates for 1955, estimated on the basis of the new official statistics, show that the attrition rate for semiprofessionals (3.76 percent half-annual) should be lower than for professionals (4.25 percent half-annual). In *SPM* it was argued that historically this also should have been the case. Various computations suggested the attrition rate of 4 percent for professionals and 2 to 3 percent for semiprofessionals. Now if official statistics are taken at face value (in this case it does not make any difference why official announcements in the past understated the losses and overstated the totals), it is obvious that this is not true. The attrition rate among semiprofessionals is substantially higher than among professionals.

GENERAL NOTE TO APPENDIX TABLES, SERIES VI–B.—*Estimating techniques: Attrition rates and projections of the number of specialists employed in the national economy*

Table VI–B–1 presents figures on the estimated attrition and attrition rates among the total number of Soviet professionals and semiprofessionals for recent years. Tables VI–B–2–P, VI–B–2–SP, VI–B–3–P, VI–B–3–SP, VI–B–5–P and VI–B–5–SP deal with data on the stock, graduations and estimated attrition rates among Soviet professionals and semiprofessionals by field in recent years. In all these tables the attrition rate (a) during the year ($n+1$) is estimated in accordance with the formula:

$$a_{n+1} = ([T_n + G_{n+1}] - T_{n+1}) : T_n$$

where T_n—number of specialists employed in the national economy as of the year end (n);

G_{n+1}—graduating class of the year ($n+1$);

T_{n+1}—number of specialists actually employed at the year end ($n+1$).

Tables VI–B–4–P and VI–B–4–SP give projections of the number of specialists employed in the national economy of the U.S.S.R. for 1960 and 1965. These projections are based on the formula:

$$T_{n+1} = T_n(1-a) + G_{n+1}$$

where T_{n+1}—estimated number of specialists employed in the national economy at year end ($n+1$);

T_n—the number of specialists at the year end (n);

G_{n+1}—graduating class of the year ($n+1$); and

a—assumed (or estimated) rate of attrition

It is concerning the latter—the estimated or assumed annual attrition rate—that most of the problems arise.

In *SPM* most estimates were made under assumed 2 and 4 percent average annual losses. These percentages were chosen on the basis of the evidence found in Soviet sources. In 1948 I. A. Liasnikov, in a discussion of a "staff method" of determination of needs for trained specialists (especially engineers), employed these percentages in his calculations.[1] He stated that for the 1930's this rate of losses was proved to be correct. (Liasnikov himself was concerned with the projection of need and supply of specialists for the 1950's.) In the early 1930's the Gosplan designed the "staff method" of estimating the requirements of professionals.[2] It was stated at that time that the average annual losses for professionals and semiprofessionals should be about 4 percent, which included losses due both to natural causes and to "political causes" (*ubyl' po fizicheskim prichinam* [*smert', invalidnost'*] *i otsev vvidu politicheskogo nesootvetstviia*).[3]

Furthermore, *SPM* made the assumption that

[1] *VVSh*, No. 4, 1948, pp. 12–17.
[2] *Plan Kadrov–1930*, esp. pp. 11–30.
[3] *Ibid.*, pp. 24 and 103.

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there are no transfers from one field of specialists into another. Despite the policy of forced placement of Soviet specialists (see discussion in the text in Chs. IV and VI), some transfer from one field into another undoubtedly takes place. It is certainly much more limited than in any free democratic society. While in some fields (like medicine) there is hardly any transfer, in certain others (like the socioeconomic segment) there is significant flux. The assumption of a uniform attrition rate for every field is a convenient device for making projections. In fact, recent Soviet sources (Nozhko[4] and Komarov[5]) continue to ascertain annual attrition rates in the same range of 2 to 5 percent. However, as the data in Tables VI–B–2–P, VI–B–2–SP, VI–B–3–P, VI–B–3–SP, VI–B–5–P, and VI–B–5–SP clearly indicate, there are differential rates for individual fields. Attrition rates among agricultural field specialists, for example, are substantially higher than for other fields. Thus while the attrition rate of 2 to 4 percent in indeed empirically correct for totals of professionals in all fields in recent years, the actual attrition rates for individual fields deviate consderably from it. It is the deviation of specific attrition rates for individual fields which is the chief cause of errors in long-run estimates based on the assumption of uniform rates.

[4] *VVSh*, No. 4, 1957, pp. 16, 18.
[5] *Plan Khoz*, No. 9, 1957, p. 61.

TABLE VI–B–1.—*Number, graduates and estimated annual attrition rates for Soviet professionals and semiprofessionals in all fields employed in the national economy of the U.S.S.R., 1954–59*

	Professionals	Semi-professionals
Employed July 1, 1954	2,008,000	2,629,000
Influx 1954 graduates	235,000	332,000
Sum	2,243,000	2,961,000
Actually employed July 1, 1955	2,184,000	2,949,000
Absolute losses	—59,000	—12,000
Attrition rate in percent	2.94	0.46
Employed July 1, 1955	2,184,000	2,949,000
Influx 1955 graduates	246,000	389,000
Sum	2,430,000	3,338,000
Actually employed January 1, 1956	2,340,000	3,213,000
Absolute losses	—90,000	—125,000
Attrition rate in percent	4.12	4.24
Employed January 1, 1956	2,340,000	3,213,000
Influx 1956 graduates	260,000	510,000
Sum	2,600,000	3,723,000
Actually employed December 1, 1956	2,633,000	3,624,000
Absolute losses	+33,000	—99,000
Attrition rate in percent	positive 1.41	3.80
Employed December 1, 1956	2,633,000	3,624,000
Influx 1957 graduates	267,000	504,000
Sum	2,900,000	4,128,000
Actually employed December 1, 1957	2,805,000	4,016,000
Absolute losses	—95,000	—112,000
Attrition rate in percent	3.61	3.09
Employed December 1, 1957	2,805,000	4,016,000
Influx 1958 graduates	291,000	549,000
Sum	3,096,000	4,565,000
Actually employed as of end of 1958	3,027,000	4,449,000
Absolute losses	—69,000	—116,000
Attrition rate in percent	2.46	2.89
Employed as of end of 1958	3,027,000	4,449,000
Influx of 1959 graduates	338,000	528,000
Sum	3,365,000	4,977,000
Actually employed as of Dec. 1, 1959	3,236,000	4,781,000
Absolute losses	—129,000	—196,000
Attrition rate in percent	4.26	4.40

SOURCES Appendix Tables III–A–1–G and IV–A–1–G; *NKh–1956*, p. 194; *NKh–1957*, pp. 208–09; *Dos–1957*, p. 258; *SSSR Tsif–1958*, pp. 316–17; *Vestnik statistiki*, No. 7, 1958, p. 87; No. 5, 1959, p. 80; *NarKhoz–1959*, p. 673; *NarKhoz–1960*, p. 602.

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TABLE VI–B–2–P.—*Soviet professional labor force: supply, graduates and attrition rates, 1955–56*
[in thousands]

Specialty Branch	Number employed as of July 1, 1955	Graduates			Hypothetical number as of year end 1956	Number employed as of Dec. 1, 1956	Implied losses (number)	Implied attrition rate in %
		1955	1956	1955–1956 Total				
	A	B	C	D	E	F	G	H
1. Engineering-industrial	585.9	65.9	70.7	136.6	722.5	720.9	—1.6	negligible
2. Agricultural	158.7	24.1	26.2	50.3	209.0	179.5	—29.5	18.5
3. Socioeconomic	160.9	15.6	18.7	34.3	195.2	196.7	+1.5	negligible (positive)
4. Educational-cultural	906.4	123.3	124.1	247.4	1,153.8	1,116.6	—37.2	4.1
5. Health	299.0	16.8	20.2	37.0	336.0	329.4	—6.6	2.2
Total, 1–5	2,110.9	245.7	259.9	505.6	2,616.5	2,543.1	—73.4	3.5
Unexplained residual	73.1	.....	.....	.....	73.1	88.1	+15.0	.....
Official grand total	2,184.0	245.7	259.9	505.6	2,689.6	2,631.2	—58.4	2.7

SOURCES AND NOTES TO TABLE VI–B–2–P

Col. A—*NKh–1956*, p. 194.
Col. B, C—Appendix Table IV–A–1–G, above.
Col. D—By addition of Col. B and C.
Col. E—By addition of Col. A and D. Note this is a hypothetical total and no allowance for losses was made.
Col. F—Official reporting of professionals employed in the national economy as of Dec. 1, 1956 in *NKh–1957*, p. 209.
Col. G—Difference: Col. E minus Col. F.
Col. H—Implied attrition rate derived as a ratio of Col. G to Col. A in percent (of 1955 base).

General comment: It is evident from the data in Table VI–B–2–P that some redistribution of graduates is made so that the specialty fields of graduation are included in slightly different reporting categories of specialty branches of employment.

Moreover, it is to be noted in particular that the implied attrition rates are extremely low. If we were to apply assumed attrition rates, we would obtain estimated two-year losses as follows:

	Assumed Attrition Rates of		
	3.0%	3.5%	4.0%
2-year losses	160,000	184,000	210,000

But since the implied loss was only fifty-eight thousand, we are forced to conclude that the net inflow from "unaccounted sources" was anywhere from 100,000 to 150,000. The problem is to ascertain what these "unaccounted sources" of inflow might have been. Two social phenomena are important. The release of prisoners of slave labor camps and persons discharged from the armed forces which took place in these years could easily provide the professional labor force of the Soviet civilian economy with these increments. There is a high likelihood that this is the case.

TABLE VI–B–2–SP.—*Soviet semiprofessional labor force: supply, graduates and attrition rates, 1955–56*
[in thousands]

Specialty branch	Number employed as of July 1, 1955	Graduates			Hypothetical number as of year end 1955	Number employed as of Dec. 1, 1956	Implied losses (number)	Implied attrition rate in %
		1955	1956	1955–1956 Total				
	A	B	C	D	E	F	G	H
1. Engineering-industrial	804.9	164.7	220.1	384.8	1,189.7	1,049.7	—140.0	17.4
2. Agricultural	254.4	57.8	76.8	134.6	389.0	295.4	—93.6	36.7
3. Socioeconomic	209.3	30.5	39.1	69.6	278.9	274.8	—4.1	2.0
4. Educational-cultural	818.6	78.5	95.0	173.5	992.1	934.1	—58.0	7.1
5. Health	731.1	56.3	79.1	135.4	866.5	900.2	+33.7	4.6 Positive
Total, 1–5	2,818.3	387.8	510.1	897.9	3,716.2	3,454.2	—262.0	9.3
Unexplained residual	130.8	.....	.....	.....	130.8	167.4	+36.6	.....
Official grand total	2,949.1	387.8	510.1	897.9	3,847.0	3,621.6	—225.4	7.6

SOURCES AND NOTES TO TABLE VI–B–2–SP

Col. A—*NKh–1956*, p. 194.
Cols. B, C—Appendix Table III–A–1–G, above.
Col. D—By addition of Cols. B and C.
Col. E—By addition of Cols. A and D. Note that this is a hypothetical total and no allowance for losses was made.
Col. F—Official reporting of semiprofessionals employed in the national economy as of Dec. 1, 1956, in *NKh–1957*, pp. 209–10.
Col. G—Difference: Col. E minus Col. F.
Col. H—Implied attrition rate derived as a ratio of Col. G to Col. A in percent (of 1955 base).

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General note: It is evident from the data in Table VI–B–2–SP that some redistribution of semiprofessional graduates is made so that the specialty fields of graduation are included in slightly different reporting categories of specialty branches of employment. Moreover, it is to be noted in particular that the implied attrition rates for engineering and agricultural branch graduates are extremely high, a fact which might be caused (in addition to the redistribution of graduates) by the high rate of absorption of semiprofessional graduates in these fields into the military establishment as well as the high rate of those who continue their education further.

TABLE VI–B–3–P.—*Soviet professional labor force: supply, graduates and attrition rates, 1956–57*
[in thousands]

Specialty branch	Number employed as of Dec. 1, 1956	Graduates 1957	Hypothetical number as of year end 1957	Number employed as of Dec. 1, 1957	Implied losses (number)	Implied attrition rate in %
	A	B	C	D	E	F
1. Engineering-industrial	721.0	83.1	804. 1	816.0	+11.9	1.6 (positive)
2. Agricultural	180.0	29.8	209.8	193.0	—16.8	9.3
3. Socioeconomic	198.0	20.2	218.2	215.0	—3.2	1.6
4. Educational-cultural	1,117.0	109.2	1,226.2	1,145.0	—81.2	7.3
5. Health	329.0	24.2	353.2	346.0	—7.2	2.2
Total	2,545.0	266.5	2,811.5	2,715.0	—96.5	3.8
Residual	88.0	.....	88.0	90.0	+2.0	.....
Grand total	2,633.0	266.5	2,899.5	2,805.0	—94.5	3.6

SOURCES AND NOTES TO TABLE VI–B–3–P

Col. A—*NKh–1957*, pp. 209, 210 (figures rounded to closest thousands).
Col. B—Appendix Table IV–A–1–G above.
Col. C—By addition of Col. A and Col. B. This is the hypothetical number of professionals employed at the end of 1957 and no allowance for losses was made.
Col. D—Official reporting of the number of professionals employed in the civilian economy from *SSSR-Tsif–1958*, p. 317 and *Vestnik statistiki*, No. 7, 1958, p. 87.
Col. E—Difference: Col. C minus Col. D.
Col. F—Ratio of Col. E to Col. A in percent (of 1956 base).
General note: Some redistribution of graduates into specialty branches of employment different from those in which they were classified by training is very likely. Except for the engineering-industrial branch (where the influx of discharged members of the armed forces was likely), the implied attrition rates are not unlikely, though (probably because of redistribution) they appear to be erratic with great variation from one branch to another.

TABLE VI–B–3–SP.—*Soviet semiprofessional labor force: supply, graduates and attrition rates, 1956–57*
[in thousands]

Specialty branch	Number employed as of Dec. 1, 1956	Graduates 1957	Hypothetical number as of year end 1957	Number employed as of Dec. 1, 1957	Implied losses (number)	Implied attrition rate in %
	A	B	C	D	E	F
1. Engineering-industrial	1,049.7	205.5	1,255.2	1,257.0	+2.0	negligible positive
2. Agricultural	295.4	82.8	378.2	310.0	—68.2	23.1
3. Socioeconomic	274.8	41.4	316.2	314.0	—2.2	0.8
4. Educational-cultural	934.1	84.6	1,018.7	971.0	—47.7	5.1
5. Health	900.2	89.7	989.9	980.0	—9.9	1.1
Total	3,454.2	504.0	3,958.2	3,832.0	—126.2	3.6
Residual	167.4	.....	167.4	184.0	+16.6	.....
Grand total	3,621.6	504.0	4,125.6	4,016.0	—109.6	3.0

SOURCES AND NOTES TO TABLE VI–B–3–SP

Col. A—*NKh–1957*, pp. 209–10.
Col. B—Appendix Table III–A–1–G above.
Col. C—By addition of Col. A and Col. B. This is the hypothetical number of semiprofessionals employed at the end of 1957 and no allowance for losses was made.
Col. D—Official reporting of the number of semiprofessionals employed in the civilian economy from *SSSR-Tsif–1958*, p. 318 and *Vestnik statistiki*, No. 7, 1958, p. 87.
Col. E—Difference: Col. C minus Col. D.
Col. F—Ratio of Col. E to Col. A in percent (of 1956 base).

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General note: Some redistribution of graduates into specialty branches of employment different from those in which they were classified by training is very likely. Except for the engineering-industrial branch (where the influx of discharged members of the armed forces was likely) and the agricultural branch (where the absorption of semiprofessionals for the armed services may have been especially high), the implied attrition rates are not entirely out of line, though (probably because of redistribution) they appear to be erratic with great variation from one branch to another.

TABLE VI–B–4–P.—*Soviet professional labor force: supply, graduates and projection of the number employed, 1957–60, 1965*
[in thousands]

Specialty branch	Number employed as of Dec. 1, 1957	Graduates 1958	Estimated number employed as of Jan. 1959	Graduates 1959	Estimated number employed as of Jan. 1960	Projected graduates, average annual 1960–65	Projection of number employed as of Jan. 1966	
							Estimated at 2.5 percent	Estimated at 3.5 percent
	A	B	C	D	E	F	G	H
1. Engineering, industrial	816.0	94.0	889.5	106.0	973.4	126.0	1,546.3	1,478.8
2. Agricultural	193.0	31.0	219.2	34.0	247.8	35.0	410.0	392.4
3. Socioeconomic	215.0	28.0	237.6	21.0	252.6	35.0	414.2	396.1
4. Educational-cultural	1,145.0	113.0	1,229.3	149.0	1,347.6	111.0	1,783.2	1,698.4
5. Health	346.0	25.0	362.3	30.0	383.2	28.0	486.8	463.1
Total, 1–5	2,715.0	291.0	2,938.1	340.0	3,204.6	335.0	4,640.5	4,428.8
Unexplained residual	90.0	.....	87.7	.....	85.5	.....	73.3	70.0
Official grand total	2,805.0	291.0	3,025.7[a]	340.0	3,290.1	335.0	4,713.8	4,498.8[b]

[a] Actual officially reported total (*Vestnik statistiki*, No. 5, 1959, p. 80) is 3,027 000.

[b] Officially estimated total (*Eliutin–VSSS–1959*, p. 96) is given as 4,500,000.

SOURCES AND NOTES TO TABLE VI–B–4–P

Col. A—*SSSR-Tsif–1958*, p. 317.
Cols. B, D—Appendix Table IV–A–1–G.
Col. F—Appendix Table IV–A–2.
Cols. C, E—Estimated number of employed professional graduates on the basis of actual employment as of Dec. 1, 1957, and graduating classes of 1958 and 1959 by applying the attrition rate of 2.5 percent per annum.
Cols. G, H—Projected number of professional graduates as of Jan. 1966 derived on the basis of the estimated employment as of Jan. 1960 (Col. E) and annual graduations during the period 1960–65 (by applying attrition rates: Col. G—2.5 percent and Col. H, 3.5 percent per annum.) Note that 1959 graduates were omitted for they were already accounted for in the earlier estimate (Col. E).

TABLE VI–B–4–SP.—*Soviet semiprofessional labor force: supply, graduates and projection of the number employed, 1957–60, 1965*
[in thousands]

Specialty branch	Number employed as of 1957	Graduates 1958	Estimated number employed as of Jan. 1959	Graduates 1959	Estimated number employed as of Jan. 1960	Projected graduates, average annual 1960–65	Projected number employed as of Jan. 1966
	A	B	C	D	E	F	G
1. Engineering-industrial	1,257.0	256.0	1,475.2	254.0	1,685.0	240.0	2,739.6
2. Agricultural	310.0	81.0	381.8	91.0	461.3	90.0	885.9
3. Socioeconomic	314.0	41.0	345.5	54.0	389.1	60.0	658.0
4. Educational-cultural	971.0	83.0	1,024.9	51.0	1,045.0	40.0	1,092.9
5. Health	980.0	88.0	1,038.6	70.0	1,077.5	55.0	1,203.4
Total, 1–5	3,832.0	549.0	4,266.0	520.0	4,657.9	485.0	6,579.8
Unexplained residual	184.0	.....	178.5	.....	173.1	.....	144.0
Official grand total	4,016.0	549.0	4,444.5[a]	520.0	4,831.0	485.0	6,723.8

[a] Actual total officially reported (*Vestnik statistiki*, No. 5, 1959, p. 80) is 4,449,000.

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SOURCES AND NOTES TO TABLE VI–B–4–SP

Col. A—*SSSR-Tsif–1958*, p. 318.
Cols. B, D—Appendix Table III–A–1–G.
Cols. C, E—Estimated number of graduates on the basis of actual employment as of Dec. 1, 1957, and graduating classes of 1958 and 1959 by applying uniform attrition rate of 3% per annum.
Col. F—Hypothetical projection of semiprofessional graduates for the period of the 7-Year Plan obtained as follows. Assuming that technicum acceptances will be kept as anticipated on the level of 4,000,000 (*Pravda*, Feb. 8, 1959—directives of the 7-Year Plan) and that the success rate of students in semiprofessional schools will be about 85 percent, then we know that the total number of graduates which could be anticipated to graduate from technicums during the 7-year period would be about 3,400,000, or about 485,000 annually. If we assume that hypothetical graduations in engineering-industrial and agricultural technicums remain on about the same level as in 1957–59 and that semiprofessionals trained in the educational-cultural and health branches are reduced as the trend indicated during the 1955–59 period, we obtain the approximate distribution as stated in Col. F. Note that the figures in Col. F were actually taken as points on micrometric graph paper on which the graduation trends for 1950–59 were plotted. In other words, these figures are extrapolations of a geometrically contructed regression line on the basis of the 9-year data. This is a hypothetical construction and the figures are useful as approximations only.
Col. G—Hypothetical projection of the number employed as of Jan. 1966 on the basis of the estimated number employed as of Jan. 1960 (Col. E) and the hypothetical average annual number of graduates and an assumed 3 percent attrition rate.
General Note: Note that unlike the projection of professional graduates where sufficiently reliable figures for 1959–65 graduations were available, the projection for semiprofessionals is handicapped by a lacuna of primary-source data on the actual number and distribution of graduates by branch of study, which instead have been obtained on the basis of a hypothetical construct.

TABLE VI–B–5–P.—*Soviet professional labor force: supply, graduates and attrition rates, 1957–59*
[in thousands]

Specialty branch	Number employed as of Dec. 1 1957	Graduates			Hypothetical number as of year 1959	Number employed as of Dec. 1 1959	Implied losses (number)	Implied attrition rate in percent
		1958	1959	1958–1959 total				
	A	B	C	D	E	F	G	H
1. Engineering-industrial	816.0	93.6	108.6	202.2	1,018.2	987.0	—31.2	3.8
2. Agricultural	193.0	30.9	34.5	65.4	258.4	222.0	—36.4	18.9
3. Socioeconomic	215.0	24.0	25.0	49.0	264.0	259.0	—5.0	2.3
4. Educational-cultural	1,145.0	116.2	140.4	256.6	1,401.6	1,279.0	—122.6	10.7
5. Health	346.0	26.1	29.5	55.6	401.6	379.0	—22.6	6.5
Total 1-5	2,715.0	290.8	338.0	628.8	3,343.8	3,126.0	—217.8	8.0
Unexplained residual	90.0	.....	.....	.....	90.0	110.0	+20.0	.....
Official grand total	2,805.0	290.8	338.0	628.8	3,433.8	3,236.0	—197.8	7.1

SOURCES AND NOTES TO TABLE VI–B–5–P

Col. A—*NarKhoz–1959*, p. 674.
Cols. B, C—Appendix Table IV–A–1–G.
Col. D, E—By addition.
Col. F—*NarKhoz–1960*, p. 604.
Col. G—Difference of Col. E minus Col. F.
Col. H—Implied attrition rate as a ratio of Col. G to Col. A in percent of 1957 base.
General note: The data in Table VI–B–5–P were processed after the appearance of official statistics in *NarKhoz–1960*. In Table VI–B–4–P above the estimated number of professionals employed in the national economy was derived on the basis of the estimated number of graduates for 1958 and 1959 rather than officially reported figures. Furthermore, Table VI–B–4–P employed a uniform attrition rate of 2.5 percent per annum for the years 1958 and 1959. These earlier author's estimates compare with the official statistics as follows:

	Estimated Jan. 1960	Official Dec. 1959
1. Engineering-industrial	973.4	987.0
2. Agricultural	247.8	222.0
3. Socioeconomic	252.6	259.0
4. Educational-cultural	1,347.6	1,279.0
5. Health	383.2	379.0
Total	3,204.6	3,126.0
Residual	85.5	110.0
Official grand total	3,290.1	3,236.0

The deviation between the estimated and official figures is in the same direction as the differential attrition rates shown in Table VI–B–5–P would indicate.

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TABLE VI–B–5–SP.—*Soviet semiprofessional labor force: supply, graduates and attrition rates, 1957–59*
[In thousands]

Specialty branch	Number employed as of Dec. 1 1957	Graduates			Hypothetical number as of year end 1959	Number employed as of Dec. 1 1959	Implied losses (number)	Implied attrition rate in percent
		1958	1959	1958–1959 total				
	A	B	C	D	E	F	G	H
1. Engineering-industrial	1,257.0	261.9	264.8	526.7	1,783.7	1,679.0	—104.7	8.3
2. Agricultural	310,0	96.3	89.5	185.8	495.8	361.0	—134.8	43.5
3. Socioeconomic	314.0	45.2	50.3	95.5	409.5	404.0	—5.5	1.8
4. Educational-cultural	971.0	70.6	52.3	122.9	1,093.9	1,018.0	—75.9	7.8
5. Health	980.0	77.2	71.0	148.2	1,128.2	1,120.0	—8.2	3.7
Total 1-5	3,832.0	551.2	527.9	1,079.1	4,911.1	4,582.0	—329.1	8.6
Unexplained residual	184.0	.....	.....	.....	184.0	199.0	+15.0	.....
Official grand total	4,016.0	551.2	527.9	1,079.1	5,095.1	4,781.0	—314.1	7.8

SOURCES AND NOTES TO TABLE VI–B–5–SP

Col. A—*NarKhoz–1959*, p. 674.
Cols. B,C—Appendix Table III–A–1–G.
Cols, D,E—By addition.
Col. F—*NarKhoz–1960*, p. 604.
Col. G—Difference of Col. E minus Col. F.
Col. H—Implied attrition rate as a ratio of Col. G to Col. A in percent of 1957 base.

General note: The data in Table VI–B–5–SP were processed after the appearance of official statistics in *NarKhoz–1960*. In Table VI–B–4–SP above the estimated number of semiprofessionals employed in the national economy was derived on the basis of the estimated number of graduates for 1958 and 1959 rather than officially reported figures. Furthermore, Table VI–B–4–SP employed a uniform attrition rate of 3 percent per annum for the years 1958 and 1959. These earlier author's estimates compare with the official statistics as follows:

	Estimated Jan. 1960	Official Dec. 1959
1. Engineering-industrial	1,685.0	1,679.0
2. Agricultural	461.3	361.0
3. Socioeconomic	389.1	404.0
4. Educational-cultural	1,045.0	1,018.0
5. Health	1,077.5	1,120.0
Total	4,657.9	4,582.0
Residual	173.1	199.0
Official grand total	4,831.0	4,781.0

The deviation between the estimated and official figures is in the same direction as the differential attrition rates shown in Table VI–B–5–SP would indicate.

General Note to Appendix Tables, Series VI–C

Appendix Tables, Series VI–C, present data on the number and distribution of specialists, professionals and semiprofessionals in the national economy of the U.S.S.R. by the specialty field in which they were formerly trained and by their place of present employment. In comparing the two sets of data as indicated by the alignment of rows on the left and the right sides of the table, a conjecture is made concerning the approximate correspondence of the fields of training and the sectors of employment of specialists in the national economy. Although comparison of the two sets of data is initially based on conjecture, for four different years for the U.S.S.R. and one regional unit (Ukrainian SSR) they reveal close correspondence between the original fields of training and branches of employment.

This does not mean to imply that among specialists employed in a given branch of the national economy (i.e., on the right side—"I. Teachers and administrators in general education schools, specialized and professional training establishments; cultural, enlightenment and recreational establishments") we find exclusive education field professionals by field of former training (i.e., on the left side—"4. Teachers and university graduates [excluding economists, medical doctors and jurists]; librarians and cultural service specialists"). There are undoubtedly other field professionals who are also employed in this branch of the economy. The important consideration, however, is that probably the *majority* of professionals employed in a given branch are specialists trained formerly in specialty fields for such employment. The close correspondence of the two sets of data, in terms of both absolute figures and especially percent distribution, goes beyond mere conjecture and indicates that in fact (despite whatever transfers do take place), there is consistently equiproportional relationship between the aggregate data for specialists by field of training and by branch of employment.

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TABLE VI–C–1–P.—*Supply and employment of higher education graduates in the U.S.S.R. as of January 1, 1941*
[In thousands and percent]

Supply of professional graduates employed in the national economy by specialty fields in which they received formal training			Employment of professional graduates by type of institutions and branches of the national economy in which they were employed		
Specialty fields at graduation	Thousands	Percent	Percent	Thousands	Branches of employment
					1. *Industry and related*
			16.9	153	A. Industrial enterprises (manufacturing, mining and utilities; *intra-unit* employment only)
			1.9	17	B. Construction enterprises (building and structural assembly)
			1.9	17	C. Transportation and communication
			9.9	91	D. Design and develpoment institutes, bureaus, offices and administrations; research institutes; geological explorations and surveying
1. Engineers and other industrial field professionals	290	31.9	30.6	278	*Sub-Total; A–D*
					2. *Agriculture*
			0.5	5	E. Collective farms and machine-tractor stations
			0.8	7	F. State farms and auxiliary agriculture produce processing establishments
2. Agricultural field professionals (agronomists, veterinarians, etc.)	70	7.7	1.3	12	*Sub-Total: E–F*
					3. *Procurement and distribution*
			0.2	2	G. Trade organizations; restaurants and public dining and catering services; procurement and material-technical supply organizations
					4. *Government administration, economic management and planning organs*
			14.9	135	H. Governmental and economic administration (ministries, central administrations, offices, bureaus, councils, etc.); cooperative, trade union and other social organizations; banking, insurance and social security
3. Socioeconomic field professionals	80	8.8	15.1	137	*Sub-Total: G–H*
a. Economists, planning specialists and statisticians	(57)	(6.3)			
b. Merchandising specialists	(2)	(0.2)			
c. Jurisprudence specialists	(21)	(2.3)			
Total: 1–3	440	48.4	47.1	427	*Total: 1–4*
					5. *Education and cultural services*
4. Teachers and university graduates (excluding economists, medical doctors, and jurists), librarians and cultural service specialists	300	33.1	37.9	344	I. Teachers and administrators in general education schools, specialized and professional training establishments; cultural, enlightenment and recreational establishments
					6. *Public health*
5. Medical doctors (excluding dentists)	141	15.5	12.5	114	J. Medical and public health institutions, sanatoria, rest homes
Accounted Total: 1–5	881	97.0	97.5	885	Accounted Total: 1–6
Undistributed residual	27	3.0	2.5	23	Undistributed residual
Reported Grand Total	908	100.0	100.0	908	Reported Grand Total

Sources and Notes: *Dos–1957*, pp. 258–60; *Vestnik statistiki*, No. 7, 1958, p. 87–88; *SSSR-Tsif–1958*, p. 319–22; *NarKhoz–1959*, p. 675. Employment in the national economy excludes military personnel.

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TABLE VI–C–2–P.—*Supply and employment of higher education graduates in the U.S.S.R. as of December 1, 1956*

[In thousands and percent]

Supply of professional graduates employed in the national economy by specialty fields in which they received formal training			Employment of professional graduates by type of institutions and branches of the national economy in which they were employed		
Specialty fields at graduation	Thousands	Percent	Percent	Thousands	Branches of employment
					1. *Industry and related*
			12.1	320	A. Industrial enterprises (manufacturing, mining and utilities; *intra-unit* employment only)
			2.0	54	B. Construction enterprises (building and structural assembly)
			2.0	54	C. Transportation and communication
			11.1	291	D. Design and development institutes, bureaus, offices and administrations; research institutes; geological explorations and surveying
1. Engineers and other industrial field professionals	721	27.5	27.2	719	*Sub-Total: A–D*
					2. *Agriculture*
			2.7	72	E. Collective farms and machine-tractor stations
			1.0	26	F. State farms and auxiliary agricultural produce processing establishments
2. Agricultural field professionals (agronomists, veterinarians, etc.)	180	6.8	3.7	98	*Sub-Total: D–F*
					3. *Procurement and distribution*
			1.1	28	G. Trade organizations; restaurants and public dining and catering services; procurement and material-technical supply organizations
					4. *Government administration, economic management and planning organs*
			9.1	241	H. Governmental and economic administration (ministries, central administrations, offices, bureaus, councils, etc.); cooperative, trade union and other social organizations; banking, insurance and social security
3. Socioeconomic field professionals	198	7.5	10.2	269	*Sub-Total: G–H*
a. Economists, planning specialists and statisticians	(139)	(4.9)			
b. Merchandising specialists	(11)	(0.4)			
c. Jurisprudence specialists	(57)	(2.2)			
Total: 1–3	1,099	41.8	41.2	1,086	*Total: 1–4*
					5. *Education and cultural services*
4. Teachers and university graduates (excluding economists, medical doctors, and jurists), librarians and cultural service specialists	1,117	42.4	43.0	1,131	I. Teachers and administrators in general education schools, specialized and professional training establishments; cultural, enlightenment and recreational establishments
					6. *Public health*
5. Medical doctors (excluding dentists)	329	12.5	10.8	284	J. Medical and public health institutions, sanatoria, rest homes
Accounted Total: 1–5	2,545	96.7	95.0	2,501	Accounted Total: 1–6
Undistributed residual	88	3.3	5.0	132	Undistributed residual
Reported Grand Total	2,633	100.0	100.0	2,633	Reported Grand Total

Sources and Notes: *Dos–1957*, pp. 258–60. Employment in the national economy excludes military personnel.

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TABLE VI–C–5–P.—*Supply and employment of higher education graduates in the U.S.S.R. as of December 1, 1959*
[In thousands and per cent]

Supply of professional graduates employed in the national economy by specialty fields in which they received formal training			Employment of professional graduates by type of institutions and branches of the national economy in which they were employed		
Specialty fields at graduation	Thousands	Percent	Percent	Thousands	Branches of employment
					1. *Industry and related*
			13.7	443	A. Industrial enterprises (manufacturing, mining and utilities; *intra-unit* employment only)
			2.5	82	B. Construction enterprises (building and structural assembly)
			2.1	68	C. Transportation and communication
			13.9	449	D. Design and development institutes, bureaus, offices and administrations; research institutes; geological explorations and surveying
1. Engineers and other industrial field professionals	987	30.5	32.2	1,042	*Sub-Total: A–D*
					2. *Agriculture*
			1.5	48	E. Collective farms and machine-tractor stations
			1.3	43	F. State farms and auxiliary agricultural produce processing establishments
2. Agricultural field professionals (agronomists, veterinarians, etc.)	222	6.9	2.8	91	*Sub-Total: D–F*
					3. *Procurement and distribution*
			1.8	57	G. Trade organizations; restaurants and public dining and catering services; procurement and material-technical supply organizations
					4. *Government administration, economic management and planning organs*
			9.1	295	H. Governmental and economic administration (ministries, central administrations, offices, bureaus, councils, etc.); cooperative, trade union and other social organizations; banking, insurance and social security
3. Socioeconomic field professionals	259	8.0	10.9	352	*Sub-Total: G–H*
a. Economists, planning specialists and statisticians	(178)	(5.5)			
b. Merchandising specialists	(16)	(0.5)			
c. Jurisprudence specialists	(65)	(2.0)			
Total: 1–3	1,468	45.4	45.9	1,485	*Total: 1–4*
					5. *Education and cultural services*
4. Teachers and university graduates (excluding economists, medical doctors, and jurists), librarians and cultural service specialists	1,279	39.5	38.3	1,240	I. Teachers and administrators in general education schools, specialized and professional training establishments; cultural, enlightenment and recreational establishments
					6. *Public health*
5. Medical doctors (excluding dentists)	379	11.7	10.5	341	J. Medical and public health institutions, sanatoria, rest homes
Accounted Total: 1–5	3,126	96.6	94.7	3,066	Accounted Total: 1–6
Undistributed residual	110	3.4	5.3	170	Undistributed residual
Reported Grand Total	3,236	100.0	100.0	3,236	Reported Grand Total

SOURCE: *NarKhoz–1960*, pp. 604–05. Employment in the national economy excludes military personnel.

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TABLE VI–C–4–P.—*Supply and employment of higher education graduates in the Ukranian SSR as of December 1, 1956*
[In thousands and per cent]

Supply of professional graduates employed in the national economy by specialty fields in which they received formal training			Employment of professional graduates by type of institutions and branches of the national economy in which they were employed		
Specialty fields at graduation	Thousands	Percent	Percent	Thousands	Branches of employment
					1. *Industry and related*
			12.2	60.9	A. Industrial enterprises (manufacturing, mining, and utilities; *intra-unit* employment only)
			1.9	9.6	B. Construction enterprises (building and structural assembly)
			1.7	8.7	C. Transportation and communication
			6.6	33.3	D. Design and development institutes, bureaus, offices and administrations; research institutes; geological explorations and surveying
			(2.4)	(12.2)	of which: research institutes only
1. Engineers and other industrial field professionals	121.9	24.3	22.4	112.5	*Sub-Total: A–D*
					2. *Agriculture*
			2.7	13.4	E. Collective farms and machine-tractor stations
			0.9	4.6	F. State farms and auxiliary agricultural produce processing establishments
2. Agricultural field professionals (agronomists, veterinarians, etc.)	32.8	6.6	3.6	18.0	*Sub-Total: E–F*
					3. *Procurement and distribution*
			na	na	G. Trade organizations; restaurants and public dining and catering services; procurement and material-technical supply organizations
					4. *Government administration, economic management and planning organs*
			6.3	31.5	H. Governmental and economic administration (ministries, central administrations, offices, bureaus, councils, etc.); cooperative, trade union and other social organizations; banking insurance and social security
			(0.5)	(2.4)	of which: banking and insurance only
3. Socioeconomic field professionals	[a]23.5	4.7	6.3	[b]31.5	*Sub-Total: G–H*
a. Economists, planning specialists and statisticians	.....	.....			
b. Merchandising specialists	.....	.....			
c. Jurisprudence specialists	(na)	(na)			
Total: 1–3	178.2	35.6	32.3	162.0	*Total: 1–4*
					5. *Education and cultural services*
4. Teachers and university graduates (excluding economists, medical doctors, and jurists), librarians and cultural service specialists	230.6	46.1	48.5	242.7	I. Teachers and administrators in general education schools; specialized and professional training establishments; cultural, enlightenment and recreational establishments
					6. *Public health*
5. Medical doctors (excluding dentists)	65.2	13.0	11.6	58.0	J. Medical and public health institutions, sanatoria, rest homes
Accounted Total: 1–5	474.0	94.7	92.4	462.7	Accounted Total: 1–6
Undistributed residual	26.6	5.3	7.6	37.9	Undistributed residual
Reported Grand Total	500.6	100.0	100.0	500.6	Reported Grand Total

[a] Excluding jurisprudence
[b] Excluding trade and distribution

na—not available; most likely data included in undistributed residual

Sources and Notes: *Dosiagnenniia radians'koi Ukrainy za sorok rokiv: Statystychnyi zbirnyk* (in Ukrainian), Kiev, 1957, pp. 106–107. Employment in the national economy excludes military personnel.

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TABLE VI–C–2–SP.—*Supply and employment of semiprofessional graduates in the U.S.S.R. as of December 1, 1956*
[In thousands and percent]

Supply of semiprofessional graduates employed in the national economy by specialty fields in which they received formal training			Employment of semiprofessional graduates by type of institutions and branches of the national economy in which they were employed		
Specialty fields at graduation	Thousands	Percent	Percent	Thousands	Branches of employment
					1. *Industry and related*
			17.4	630	A. Industrial enterprises (manufacturing, mining and utilities; *intra-unit* employment only)
			2.4	89	B. Construction enterprises (building and structural assembly)
			3.8	139	C. Transportation and communication
			4.4	158	D. Design and development institutes, bureaus, offices and administrations; research institutes; geological explorations and surveying
1. Technicians and other industrial field semiprofessionals	1,050	28.9	28.0	1,016	*Sub-Total: A–D*
					2. *Agriculture*
			6.0	219	E. Collective farms and machine-tractor stations
			1.2	43	F. State farms and auxiliary agricultural produce processing establishments
2. Agricultural field semiprofessionals (agronomic, veterinary technicians, etc.)	295	8.2	7.2	262	*Sub-Total: E–F*
					3. *Procurement and distribution*
			2.6	94	G. Trade organizations; restaurants and public dining and catering services; procurement and material-technical supply organizations
					4. *Government administration, economic management and planning organs*
			6.5	237	H. Governmental and economic administration (ministries, central administrations, offices, bureaus, councils, etc.); cooperative, trade union and other social organizations; banking, insurance and social security
3. Socioeconomic field semiprofessionals, total	275	7.6	9.1	331	*Sub-Total: G–H*
a. Economic technicians (accountants, statisticians, etc.) and planning specialists	(205)	(5.6)			
b. Merchandising specialists	(47)	(1.3)			
c. Jurisprudence (archival) specialists	(23)	(0.7)			
Total, 1–3	1,620	44.7	44.3	1,609	*Total: 1–4*
					5. *Education and cultural services*
4. Elementary school teachers and educational-cultural graduates (excluding economists, medical nurses and aides); librarians and cultural service specialists	934	25.8	26.5	960	I. Teachers and administrators in general education schools, specialized and professional training establishments; cultural, enlightenment and recreational establishments
					6. *Public health*
5. Medical nurses, aides, technicians (including dentists)	900	24.8	24.0	868	J. Medical and public health institutions, sanatoria, rest homes
Accounted total: 1–5	3,454	95.3	94.8	3,437	Accounted total: 1–6
Undistributed residual	168	4.7	5.2	185	Undistributed residual
Reported Grand Total	3,622	100.0	100.0	3,622	Reported Grand Total

Source: *Dos–1957*, pp. 259–60. Employment in the national economy excludes military personnel.

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TABLE VI–C–3–SP.—*Supply and employment of semiprofessional graduates in the U.S.S.R. as of December 1, 1957*
[In thousands and percent]

Supply of semiprofessional graduates employed in the national economy by specialty fields in which they received formal training			Employment of semiprofessional graduates by type of institutions and branches of the national economy in which they were employed		
Specialty fields at graduation	Thousands	Percent	Percent	Thousands	Branches of employment
					1. *Industry and related*
			18.7	748	A. Industrial enterprises (manufacturing, mining and utilities; *intra-unit* employment only)
			2.8	112	B. Construction enterprises (building and structural assembly)
			3.9	159	C. Transportation and communication
			4.9	196	D. Design and development institutes, bureaus, offices and administrations; research institutes; geological explorations and surveying
1. Technicians and other industrial field semiprofessionals	1,257	31.3	30.3	1,215	*Sub-Total: A–D*
					2. *Agriculture*
			5.1	207	E. Collective farms and machine-tractor stations
			1.5	61	F. State farm and auxiliary agricultural produce processing establishments
2. Agricultural field semiprofessionals (agronomic, veterinary technicians, etc.)	310	7.7	6.6	268	*Sub-Total: E–F*
					3. *Procurement and distribution*
			3.0	119	G. Trade organizations; restaurants and public dining and catering services; procurement and material-technical supply organizations
					4. *Government administration, economic management and planning organs*
			7.0	284	H. Governmental and economic administration (ministries, central administrations, offices, bureaus, councils, etc.); cooperative, trade union and other social organizations; banking, insurance and social security
3. Socioeconomic field semiprofessionals, total	314	7.8	10.0	403	*Sub-Total: G–H*
a. Economic technicians (accountants, statisticians, etc.) and planning specialists	(237)	(5.8)			
b. Merchandising specialists	(57)	(1.3)			
c. Jurisprudence (archival) specialists	(20)	(0.7)			
Total, 1–3	1,881	46.8	46.9	1,886	*Total: 1–4*
					5. *Education and cultural services*
4. Elementary school teachers and educational-cultural graduates (excluding economists, medical nurses and aides); librarians and cultural service specialists	971	24.2	24.7	994	I. Teachers and administrators in general education schools, specialized and professional training establishments; cultural, enlightenment and recreational establishments
					6. *Public health*
5. Medical nurses, aides, technicians (including dentists)	980	24.4	23.8	955	J. Medical and public health institutions, sanatoria, rest homes
Accounted total: 1–5	3,832	95.4	95.4	3,835	Accounted total: 1–6
Undistributed residual	184	4.6	4.6	181	Undistributed residual
Reported Grand Total	4,016	100.0	100.0	4,016	Reported Grand Total

Sources: *Vestnik statistiki*, No. 7, 1958, pp. 87–88; same data are given in *SSSR–Tsif–1958*, pp. 319–22; and *NarKhoz–1959*, p. 675. Employment in the national economy excludes military personnel.

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TABLE VI–C–4–SP.—*Supply and employment of semiprofessional graduates in the Ukrainian SSR as of December 1, 1956*
[In thousands and percent]

Supply of semiprofessional graduates employed in the economy ef the Ukrainian SSR by specialty fields in which they received formal training			Employment of semiprofessional graduates by type of institutions and branches of the economy of the Ukrainian SSR in which they were employed		
Specialty fields at graduation	Thousands	Percent	Percent	Thousands	Branches of employment
					1. *Industry and related*
			15.6	101.7	A. Industrial enterprises (manufacturing, mining and utilities; *intra-unit employment* only)
			2.4	16.1	B. Construction enterprises (building and structural assembly)
			3.4	22.0	C. Transportation and communication
			1.9	12.7	D. Design and development institutes, bureaus, offices and administrations; research institutes; geological explorations and surveying
1. Technicians and other industrial field semiprofessionals	168.0	25.6	23.3	152.5	*Sub-Total: A–D*
					2. *Agriculture*
			7.8	50.9	E. Collective farms and machine-tractor stations
			1.2	8.0	F. State farms and auxiliary agricultural produce processing establishments
2. Agricultural field semiprofessionals (agronomic, veterinary technicians, etc.)	63.2	9.6	9.0	58.9	*Sub-Total: E–F*
					3. *Procurement and distribution*
			.....*.	na	G. Trade organizations; restaurants and public dining and catering services; procurement and material-technical supply organizations
					4. *Government administration, economic management and planning organs*
			5.5	36.2	H. Governmental and economic administration (ministries, central administrations, offices, bureaus, councils, etc.); cooperative, trade union and other social organizations; banking, insurance and social security
3. Socioeconomic field semiprofessionals, total	46.2	7.0	5.5	36.2	*Sub-Total: G–H*
Total, 1–3	277.4	42.2	37.8	247.6	*Total: 1–4*
					5. *Education and cultural services*
4. Elementary school teachers and educational-cultural graduates (excluding economists, medical nurses and aides); librarians and cultural service specialists	170.5	26.0	27.1	177.5	I. Teachers and administrators in general education schools, specialized and professional training establishments; cultural, enlightenment and recreational establishments
					6. *Public health*
5. Medical nurses, aides, technicians (including dentists)	178.0	27.2	26.3	172.7	J. Medical and public health institutions, sanatoria, rest homes
Accounted total: 1–5	625.9	95.4	91.2	597.8	Accounted total: 1–6
Undistributed residual	29.9	4.6	8.8*	58.0	Undistributed residual
Reported Grand Total	655.8	100.0	100.0	655.8	Reported Grand Total

Source: TsSU Ukrainian SSR, *Dosiagnenniia radians'koi Ukrainy za sorok rokiv: Statystychnyi zbirnyk*, Kiev, 1957, pp. 106–07. Employment in the national economy excludes military personnel.

*Category G is included in the residual.

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TABLE VI–C–5–SP.—*Supply and employment of semiprofessional graduates in the U.S.S.R., as of December 1, 1959*
[In thousands and percent]

Supply of semiprofessional graduates employed in the national economy by specialty fields in which they received formal training			Employment of semiprofessional graduates by type of institutions and branches of the national economy in which they were employed		
Specialty fields at graduation	Thousands	Percent	Percent	Thousands	Branches of employment
					1. *Industry and related*
			21.4	1,025	A. Industrial enterprises (manufacturing, mining and utilities; *intra-unit* employment only)
			3.5	166	B. Construction enterprises (building and structural assembly)
			4.4	212	C. Transportation and communication
			5.1	242	D. Design and development institutes, bureaus, offices, and administrations, research institutes; geological explorations and surveying
1. Technicians and other industrial field semiprofessionals	1,679	35.2	34.4	1,645	*Sub-Total: A–D*
					2. *Agriculture*
			4.0	192	E. Collective farms and machine-tractor stations
			1.7	83	F. State farms and auxiliary agricultural produce processing establishments
2. Agricultural field semiprofessionals (agronomic, veterinary technicians, etc.)	361	7.5	5.7	274	*Sub-Total: E–F*
					3. *Procurement and distribution*
			4.7	224	G. Trade organizations; restaurants and public dining and catering services; procurement and material-technical supply organizations
					4. *Government administration, economic management and planning organs*
			6.4	304	H. Governmental and economic administration (ministries, central administrations, offices, bureaus, councils, etc.); cooperative, trade union and other social organizations; banking, insurance and social security
3. Socioeconomic field semiprofessionals, total	406	8.4	11.0	528	*Total: G–H*
a. Economic technicians (accountants, statisticians, etc.) and planning specialists	(300)	(6.3)			
b. Merchandising specialists	(88)	(1.8)			
c. Jurisprudence (archival) specialists	(18)	(0.3)			
Total, 1–3	2,446	51.1	51.1	2,448	*Total: 1–4*
					5. *Education and cultural services*
4. Elementary school teachers and educational-cultural graduates (excluding economists, medical nurses and aides); librarians and cultural service specialists	1,018	21.3	21.9	1,044	I. Teachers and administrators in general education schools, specialized and professional training establishments; cultural, enlightenment and recreational establishments
					6. *Public health*
5. Medical nurses, aides, technicians (including dentists)	1,120	23.4	22.8	1,090	J. Medical and public health institutions, sanatoria, rest homes
Accounted total: 1–5	4,584	95.8	95.8	4,582	Accounted total: 1–6
Undistributed residual	197	4.2	4.2	199	Undistributed residual
Reported Grand Total	4,781	100.0	100.0	4,781	Reported Grand Total

Source: *NarKhoz–1960*, pp. 604–05. Employment in the national economy excludes military personnel.

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TABLE VI–U.S.–1.—*Total number of employed persons in the United States by major industry group, occupation group and sex, as of April 1950*
[in thousands]

		A	B	C	D	E	F	G	H	I	J	K	L	M
		Professional, technical & kindred workers	Farmers and farm managers	Managers, officials, and proprietors except farm	Clerical & kindred workers	Sales workers	Craftsmen, foremen and kindred workers	Operatives and kindred workers	Private household workers	Service workers except private household	Farm laborers and foremen	Laborers, except farm and mine	Occupation not reported	Total
1. Agriculture, forestry and fisheries	M	42	4,165	18	6	4	20	50	.....	6	1,954	135	3	6,402
	F	2	119	2	13	1	1	6	.....	4	463	3	1	614
	T	44	4,284	20	19	5	21	56	.....	10	2,417	138	4	7,016
2. Mining	M	32	.....	36	26	2	159	640	.....	6	.....	1	2	903
	F	1	.....	1	16	.....	1	5	.....	.....	.....	.....	.....	25
	T	33	.....	37	42	2	160	645	.....	6	.....	1	2	928
3. Construction	M	123	.....	279	43	9	1,920	255	.....	14	.....	644	11	3,298
	F	3	.....	5	66	1	13	3	.....	1	.....	5	1	100
	T	126	.....	284	109	10	1,934	258	.....	15	.....	649	12	3,398
4. Manufacturing	M	616	.....	644	720	400	2,691	4,258	.....	237	.....	1,201	51	10,817
	F	84	.....	47	864	29	131	2,359	.....	36	.....	68	17	3,636
	T	700	.....	691	1,584	429	2,822	6,617	.....	273	.....	1,269	68	14,453
5. Transportation, communication and other public utilities	M	135	.....	286	437	19	912	1,188	.....	127	.....	547	18	3,669
	F	15	.....	13	581	2	10	24	.....	19	.....	10	2	678
	T	150	.....	299	1,018	21	922	1,212	.....	146	.....	557	20	4,347
6. Wholesale and retail trade	M	172	.....	2,016	384	1,656	590	1,101	.....	618	.....	317	13	6,867
	F	38	.....	378	812	1,211	45	213	.....	802	.....	17	7	3,522
	T	210	.....	2,394	1,196	2,867	635	1,314	.....	1,420	.....	334	20	10,389
7. Finance, insurance and real estate	M	51	.....	262	197	398	41	10	.....	114	.....	32	4	1,109
	F	11	.....	55	592	47	2	3	.....	58	.....	1	3	774
	T	62	.....	317	789	445	43	13	.....	172	.....	33	7	1,883
8. Business and repair services	M	119	.....	166	45	36	644	122	.....	32	.....	44	2	1,211
	F	20	.....	14	121	4	9	10	.....	6	.....	1	1	185
	T	139	.....	180	166	40	653	132	.....	38	.....	45	3	1,396
9. Personal services	M	78	.....	142	37	14	103	230	73	365	.....	110	2	1,153
	F	27	.....	60	98	11	9	339	1,359	449	.....	8	2	2,363
	T	105	.....	202	135	25	112	569	1,432	814	.....	118	4	3,516
10. Entertainment and recreational services	M	107	.....	85	20	8	47	14	.....	109	.....	22	2	412
	F	33	.....	11	55	7	2	4	.....	32	.....	1	1	145
	T	140	.....	96	75	15	49	18	.....	141	.....	23	3	557
11. Professional and related services	M	1,202	.....	78	74	6	112	60	.....	344	.....	36	5	1,917
	F	1,640	.....	40	517	3	6	39	.....	475	.....	4	7	2,732
	T	2,842	.....	118	591	9	118	99	.....	819	.....	40	12	4,649
12. Public administration	M	225	.....	206	593	3	203	107	.....	371	.....	114	16	1,837
	F	67	.....	46	493	2	3	10	.....	27	.....	2	2	653
	T	292	.....	252	1,086	5	206	117	.....	398	.....	116	18	2,490
13. Industry not reported	M	10	.....	16	11	14	23	23	.....	10	.....	48	302	457
	F	4	.....	5	45	5	3	9	.....	8	.....	2	241	323
	T	14	.....	21	56	19	26	32	.....	18	.....	50	543	780
14. Total	M	2,910	4,165	4,234	2,593	2,570	7,464	8,058	73	2,353	1,954	3,249	431	40,054
	F	1,947	119	676	4,273	1,324	237	3,024	1,359	1,918	463	123	286	15,749
	T	4,857	4,284	4,910	6,866	3,894	7,701	11082	1,432	4,271	2,417	3,372	717	55,803

M—Male. F—Female. T—Total.
Source: U.S. Department of Commerce, Bureau of the Census, *United States Census of Population: 1950*, Special Report, *Occupation by Industry*, Washington, D.C.: U.S. Government Printing Office, 1954, pp. 10–11.

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TABLE VI–U.S.–2.—*Experienced United States civilian labor force of employed persons 14 years of age and over and persons with four or more years of college education, by major occupation group, as of April 1950*
[in thousands]

Occupation group	Experienced civilian labor force			Number of persons with four or more years of college education			Computed ratio of college graduates to number employed in labor force (in percent)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Professional, technical and kindred workers	2,965	1,972	4,937	1,562	870	2,432	52.68	44.11	49.26
Farmers and farm managers	4,180	121	4,301	58	4	62	1.38	0.33	1.44
Managers, officials, and proprietors except farm	4,273	681	4,954	506	50	556	11.84	7.34	11.22
Clerical and kindred workers	2,671	4,376	7,047	186	211	397	6.96	4.82	5.63
Sales workers	2,639	1,375	4,014	249	34	283	9.43	2.47	7.05
Craftsmen, foremen and kindred workers	7,846	247	8,093	130	7	137	1.66	2.83	1.69
Operatives and kindred workers	8,471	3,191	11,662	68	18	86	0.80	0.56	0.74
Private household workers	77	1,440	1,517	2	10	12	2.60	0.69	0.79
Service workers except private household	2,487	2,016	4,503	39	26	65	1.57	1.29	1.44
Farm laborers and foremen	2,054	482	2,536	11	3	14	0.53	0.62	0.55
Laborers, except farm and mine	3,581	134	3,715	20	1	21	0.56	0.75	0.56
Occupation not reported	824	448	1,272	33	17	50	4.00	3.79	3.93
Actual total	42,068	16,483	58,551	2,864	1,251	4,115	6.81	7.59	7.03

Source: U.S. Department of Commerce, Bureau of the Census, *United States Census of Population: 1950*, Special Report, *Education*, Washington D.C.: U.S. Government Printing Office, 1953, pp. 107–14.

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TABLE VI–U.S.–3.—*Estimated number of persons employed in the United States with four or more years of college education, by major industry group, occupation group and sex as of April, 1950*
[in thousands]

		A	B	C	D	E	F	G	H	I	J	K	L	M
		Professional, technical & kindred workers	Farmers and farm managers	Managers, officials, and proprietors except farm	Clerical & kindred workers	Sales workers	Craftsmen, foremen and kindred workers	Operatives and kindred workers	Private household workers	Service workers except private household	Farm laborers and foremen	Laborers, except farm and mine	Occupation not reported	Total
1. Agriculture, forestry and fisheries	M	22	58	2	.....	.....	.....	1	.....	.....	11	1	.....	95
	F	1	4	.....	1	.....	.....	.....	.....	.....	3	.....	.....	9
	T	23	62	2	1	.....	.....	1	.....	.....	14	1	.....	104
2. Mining	M	17	.....	4	2	.....	2	5	.....	.....	.....	.....	.....	30
	F	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	2
	T	18	.....	4	3	.....	2	5	.....	.....	.....	.....	.....	32
3. Construction	M	65	.....	33	3	1	32	2	.....	.....	.....	4	.....	140
	F	1	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	4
	T	66	.....	33	6	1	32	2	.....	.....	.....	4	.....	144
4. Manufacturing	M	324	.....	76	50	38	45	34	.....	4	.....	7	2	580
	F	37	.....	3	42	1	4	13	.....	1	.....	1	1	103
	T	361	.....	79	92	39	49	47	.....	5	.....	8	3	683
5. Transportation, communication and other public utilities	M	71	.....	34	30	2	15	10	.....	2	.....	3	.....	167
	F	7	.....	1	28	.....	.....	.....	.....	.....	.....	.....	.....	36
	T	78	.....	35	58	2	15	10	.....	2	.....	3	.....	203
6. Wholesale and retail trade	M	91	.....	239	27	156	10	9	.....	10	.....	2	.....	544
	F	17	.....	28	39	30	1	2	.....	10	.....	.....	.....	127
	T	108	.....	267	66	186	11	11	.....	20	.....	2	.....	671
7. Finance, insurance, and real estate	M	27	.....	31	14	38	7	.....	.....	2	.....	.....	.....	119
	F	5	.....	4	28	1	.....	.....	.....	1	.....	.....	.....	39
	T	32	.....	35	42	39	7	.....	.....	3	.....	.....	.....	158
8. Business and repair services	M	62	.....	20	3	3	11	1	.....	1	.....	.....	.....	101
	F	9	.....	1	6	.....	.....	.....	.....	.....	.....	.....	.....	16
	T	71	.....	21	9	3	11	1	.....	1	.....	.....	.....	117
9. Personal services	M	41	.....	17	3	1	2	2	2	6	.....	1	.....	75
	F	12	.....	4	5	1	.....	2	10	6	.....	.....	.....	40
	T	53	.....	21	8	2	2	4	12	12	.....	1	.....	115
10. Entertainment and recreational services	M	56	.....	10	1	1	1	.....	.....	2	.....	.....	.....	71
	F	15	.....	1	3	1	.....	.....	.....	1	.....	.....	.....	21
	T	71	.....	11	4	2	1	.....	.....	3	.....	.....	.....	92
11. Professional and related services	M	633	.....	9	5	1	2	.....	.....	5	.....	.....	.....	655
	F	723	.....	3	25	.....	.....	.....	.....	6	.....	.....	.....	757
	T	1,356	.....	12	30	1	2	.....	.....	11	.....	.....	.....	1,412
12. Public administration	M	118	.....	24	41	.....	3	1	.....	6	.....	.....	.....	193
	F	30	.....	4	24	.....	.....	.....	.....	.....	.....	.....	.....	58
	T	148	.....	28	65	.....	3	1	.....	6	.....	.....	.....	251
13. Industry not reported	M	5	.....	2	1	1	.....	.....	.....	.....	.....	.....	13	22
	F	2	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	9	13
	T	7	.....	2	3	1	.....	.....	.....	.....	.....	.....	22	35
14. Total	M	1,532	58	501	180	242	130	65	2	38	11	18	15	2,792
	F	860	4	49	207	34	5	17	10	25	3	1	10	1,225
	T	2,392	62	550	387	276	135	82	12	73	14	19	25	4,017

M—Male. F—Female. T—Total.

Source: Table VI–U.S.–1 and VI–U.S.–2.

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TABLE VI–U.S.–4.—*Number and ratio of persons with four or more years of college education among selected engineering and scientific occupations in the United States, by sex, as of April 1950*

Occupation	Totals			With four or more years of college education			Ratios		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Chemists	67,335	7,620	74,955	41,755	5,195	*46,950	62.01	68.17	62.63
Geologists and geophysicists	9,400	525	9,925	7,490	395	*7,885	79.68	75.23	79.44
Mathematicians	850	660	1,510	635	415	*1,050	74.70	62.87	69.53
Physicists	6,500	430	6,930	5,130	255	*5,385	78.92	59.30	77.70
Miscellaneous natural scientists	2,815	330	3,145	1,550	90	*1,640	55.06	27.27	52.14
Engineers, all fields, undifferentiated	.....	.....	*523,445	.....	.....	*279,065	.....	.....	53.31
Engineers, aeronautical	17,475	375	17,850	10,550	190	*10,740	60.37	50.66	60.19
Engineers, chemical	31,075	620	31,695	25,705	190	*25,895	82.71	30.64	81.70
Engineers, civil	120,375	1,830	122,205	62,930	860	*63,790	52.27	46.99	52.20
Engineers, electrical	*106,025	1,125	107,150	55,520	470	*55,990	52.38	41.77	52.25
Engineers, industrial	39,145	465	39,610	16,815	155	*16,970	42.95	33.33	42.84
Engineers, mechanical	109,610	650	110,260	55,885	320	*56,205	50.96	49.23	50.97
Engineers, metallurgical, and metallurgists	11,450	195	11,645	6,935	50	*6,985	60.56	25.64	59.98
Engineers, mining	10,290	90	10,380	6,580	25	*6,605	63.94	27.77	63.63
Engineers, not elsewhere classified	71,795	865	72,660	35,605	280	*35,885	49.59	32.36	49.38
Architects	23,030	960	23,990	14,230	565	14,795	61.78	58.85	61.67
Agricultural scientists	5,675	310	5,985	3,200	60	*3,260	56.38	19.35	54.46
Biological scientists	6,570	2,505	9,075	5,435	2,075	*7,510	82.72	82.83	82.75
Foresters and conservationists	25,935	920	26,855	8,455	115	8,570	37.56	12.50	31.91
Psychologists	2,880	2,025	4,905	2,490	1,810	4,300	86.45	89.38	87.66
Accountants and auditors	318,650	54,635	373,285	111,355	7,355	118,710	34.94	13.46	31.80
Economists	7,440	1,830	9,270	5,475	1,080	6,555	73.58	59.01	70.71
Librarians	6,185	48,930	55,115	3,180	23,485	26,665	51.41	47.99	48.38
Statisticians and actuaries	11,345	6,390	17,735	5,140	2,085	7,225	45.30	32.62	40.74
Miscellaneous social scientists	2,090	1,025	3,115	1,240	475	1,715	59.33	46.34	55.05

Sources: Figures compiled from raw data from Special Tabulation of Manpower, Occupations Card File for Bureau of Labor Statistics, made by the U.S. Department of Commerce, Bureau of the Census, for the Scientific Manpower Office of the Division of Scientific Personnel and Education of the National Science Foundation, Washington, D.C. (Courtesy of T. J. Mills and R. Cain).

*Figures previously reported in the "F" series tables in: D. M. Blank and G. J. Stigler, *The Demand and Supply of Scientific Personnel*, National Bureau of Economic Research, New York, 1957, pp. 180–188.

APPENDIX VI–Q—*Comparison of Soviet and United States Reporting of Industry Sectors* [1]

1. METALLURGY

1a. *Ferrous Metals*

The Soviet sector consists of:

(1) ferrous metallurgy
(2) iron ore mining
(3) manganese ore mining

and includes the following manufacturing codes of the United States Standard Industrial Classification:

3311 Blast furnaces
3312 Steel works and rolling mills
3313 Electrometallurgical products
3321 Gray-iron foundries
3322 Malleable-iron foundries
3323 Steel foundries
3481 Nails and spikes
3494 Bolts, nuts, washers, and rivets
3495 Screw-machine products
3393 Welded and heavy-riveted pipe
2931 Beehive coke ovens

[1] Based on classifications from: TsSU Gosplana SSSR (Tsentral'noe Statisticheskoe Upravlenie Gosplana SSSR—Central Statistical Administration of the State Planning Commission of the U.S.S.R.), *Slovar'-spravochnik po sotsial'no-ekonomicheskoi statistike* (Dictionary-Handbook on Socioeconomic Statistics), 2d ed., Moscow, 1948, pp. 105–07; Gosplan SSSR (State Planning Commission of the U.S.S.R.), *Formy i pokazateli k sostavleniiu proekta perspektivnogo plana razvitiia narodnogo khoziaistva SSSR na 1959–1965 gody* (Reporting Forms and Indicators for the Preparation of the Projected Plan for the Development of the National Economy of the U.S.S.R. for 1959–65), Moscow, 1957, pp. 12–18; and U.S. Bureau of the Budget, Office of Statistical Standards, *Standard Industrial Classification Manual*, Washington, D.C.: U.S. Government Printing Office, 1957, *passim*.

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2932 Byproduct coke ovens
3255 Clay refractories
3297 Nonclay refractories

In addition, it includes activities represented by the following categories from the mining industries:

101 Iron ores
1062 Manganese ores

1b. *Nonferrous Metals*

The Soviet sector consists of nonferrous metallurgy and all mining and processing activities related to it, and includes the following manufacturing codes of the United States Standard Industrial Classification:

3331 Primary smelting and refining of copper
3332 Primary smelting and refining of lead
3333 Primary smelting and refining of zinc
3334 Primary refining of aluminum
3339 Primary smelting and refining of nonferrous metals, not elsewhere classified
334 Secondary smelting and refining of nonferrous metals
335 Rolling, drawing, and alloying of nonferrous metals
336 Nonferrous foundries

In addition, it includes activities represented by the following categories from the mining industries:

102 Copper ores
103 Lead and zinc ores
104 Gold and silver ores
105 Bauxite and other aluminum ores
1063 Molybdenum ores
1064 Tungsten ores
1069 Ferro-alloy ores, except vanadium, not elsewhere classified
1092 Mercury ores
1093 Titanium ores
1094 Uranium-radium-vanadium ores
1099 Metallic minerals (ores), not elsewhere classified

2. Fuel Industry

The Soviet sector consists of:

Fuel extracting:
(1) coal
(2) petroleum
(3) peat
(4) shale
(5) other fuels

and

Fuel processing:
(1) coking and coal-tar chemical industry
(2) petroleum refining and cracking
(3) gas
(4) other fuel-chemical industries

and includes the following manufacturing codes of the United States Standard Industrial Classification:

2911 Petroleum refining
2992 Lubricating oils and greases not made in petroleum refineries
2999 Products of petroleum and coal, not elsewhere classified

In addition, it includes activities represented by the following categories from the mining industries:

Major group 11 Anthracite mining
Major group 11 Bituminous coal and lignite mining
Major group 13 Crude petroleum and natural gas extraction

3. Electric Power

The Soviet sector consists of:

(1) Electric power stations
(2) Transmission lines, sub-stations and distribution networks

and includes Group No. 821 in the public utilities division of the United States Standard Industrial Classification.

4. Chemical Industry

The Soviet sector consists of:

(1) Basic (heavy) chemicals
(2) Nonmetallic mining and quarrying
(3) Pharmaceutical, drug and photochemical industry
(4) Wood pulp chemical industry
(5) Other (unspecified) branches
(6) Rubber-asbestos production and fabrication

and includes all of Major 28 *with the exception* of the following manufacturing codes of the United States Standard Industrial Classification:

2824 Synthetic rubber (see below)
2841 Soap and glycerin
2881 Cottonseed oil mills
2883 Soybean oil
2884 Vegetable oil mills, not elsewhere classified
2886 Grease and tallow
2887 Fatty acids
2889 Animal oils, not elsewhere classified
2892 Essential oils
2893 Toilet preparations
2894 Glue and gelatin
2898 Refining of edible salt

but the Soviet classification includes:

3971 Plastics products, not elsewhere classified
Group
147 Chemical and fertilizer mineral mining

and also within the rubber asbestos subdivision of the chemical industry is included Major Group 30 (Rubber products):

2824 Synthetic rubber
3292 Asbestos products

5. Machine Building and Metalworking

The Soviet sector consists of:

(1) Machine building and metal processing industry: power machinery, electrical machinery, radio communications equipment (including military), machine tools, instruments, mining equipment, compressors, textile machinery, transportation machinery, railroad equipment, shipbuilding (including military), automobile industry, tractor industry, agricultural machinery industry, ballbearing, military equipment (all plants building or maintaining military equipment, including all aircraft plants), medical equipment, office equipment
(2) Metal products and metalware: consumer metalware and other technical metal products
(3) Maintenance industry: repair of consumer metalware, blacksmith and forge shops, and all other repair shops and plants
(4) Abrasive, mica and graphite products

and includes the following manufacturing codes of the United States Standard Industrial Classification:

Major group 34 Fabricated metal products (except ordnance, machinery, and transportation equipment)
Major group 35 Machinery (except electrical)
Major group 36 Electrical machinery, equipment and supplies
Major group 37 Transportation equipment
Major group 38 Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks
2591 Restaurant furniture
2541 Partitions, shelving, lockers, and office and store fixtures
2532 Professional furniture
2522 Metal office furniture
2514 Metal household furniture
3291 Abrasive products
3391 Iron and steel forgings
3392 Wire drawing

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3399 Primary metal industries, not elsewhere classified
1900 Ordnance and accessories, not elsewhere classified

6. LUMBERING, WOODWORKING AND PAPER INDUSTRY

The Soviet sector consists of:

(1) Lumbering, logging and rafting
(2) Sawmill and wood products: sawmill, plywood, furniture, wooden vehicles and conveyances, domestic utensils and toys, skiis and sporting goods, benches and carpentry tools, prefabricated wood construction materials, other (unspecified) wood fabricates
(3) Match industry
(4) Paper and cellulose industry

and includes the following manufacturing codes of the United States Standard Industrial Classification:

Major group 24 Lumber and wood products (except furniture)
Major group 26 Paper and allied products
2511 Wood household furniture, except upholstered
2512 Wood household furniture, upholstered
2515 Mattresses and bedsprings
2519 Household furniture, not elsewhere classified
2521 Wood office furniture
2531 Public-building and related furniture
2561 Window and door screens, shades and venetian blinds
2599 Furniture and fixtures, not elsewhere classified
3983 Matches

7. CONSTRUCTION MATERIALS, INCLUDING GLASS AND CERAMICS

The Soviet sector consists of:

(1) Construction materials industry: cement, other binding and cementitious materials; refractory and acid-resisting products, brick, roofing materials, quarrying of materials for construction and silica-ceramics industry
(2) Glass industry: plate and technical glass, consumer glassware
(3) Porcelain products and chinaware: industrial and sanitary utensils, consumer chinaware

and includes the following manufacturing codes of the United States Standard Industrial Classification:

324 Cement, hydraulic
3251 Brick and hollow tile
3254 Sewer pipe
3259 Structural clay products, not elsewhere classified
327 Concrete, gypsum, and plaster products
328 Cut-stone and stone products
3295 Minerals, ground or treated
3299 } Statuary and art goods (factory production)
3298 }
2274 Lineoleum, asphalted-felt-base, and other hard-surface floor coverings, not elsewhere classified
2592 Roofing felts and coatings
2951 Paving mixtures and blocks
321 Flat glass
322 Glass and glassware, pressed or blown
323 Glass products made of purchased glass
326 Pottery and related products

In addition, it includes activities represented by the following categories from the mining industries:

141 Dimension stone
142 Crushed and broken stone, including riprap
144 Sand and gravel
145 Clay, ceramic, and refractory minerals

8. PRINTING

The Soviet sector consists of:

Printing and publishing

and includes the following manufacturing code of the United States Standard Industrial Classification:

Major group 27 Printing, publishing and allied industries

9. LIGHT INDUSTRY

The Soviet sector consists of:

(1) Textile industry: cotton cleaning, flax primary processing, bast fiber, wool primary processing, silk primary processing, cotton spinning (with two subdivisions of consumer cloth and technical cloth and fabricates), flax spinning (with the same two subdivisions), wool spinning (with the same two subdivisions), silk spinning, hemp mill and related, knit wear and hosiery, felt industry
(2) Garment industry
(3) Fur and leather industry: leather tanning, leather substitutes and synthetics, saddlewares and related, luggage and haberdashery goods, fur and fur products, footwear manufacturing

and includes the following codes of the United States Standard Industrial Classification:

Major group 22 Textile mill products
Major group 23 Apparel and other finished products made from fabrics and similar materials
Major group 31 Leather and leather products
3981 Brooms and brushes
3992 Furs, dressed and dyed
3995 Umbrellas, parasols, canes
3964 Needles, pins, feathers

It *excludes:*

2774 Hard surface floor coverings (included in Construction Materials)

10. FOOD PROCESSING

The Soviet sector consists of:

(1) Industrial fats and soap and cosmetic industry
(2) Food industry: meat, fish, fruit and vegetable preserving, butter and cheese, other dairy products, vegetable oils, margarine, flour and milling products, macaroni products, bakery industry, starch and molasses products, sugar, confectionery, canning, packaging, tea, spirits, vodka, wines, brewery (beers), yeast, alcohol-free beverages, tobacco and cigarettes, other (unspecified) food industries
(3) Salt extracting
(4) Refrigeration industry

and includes the following manufacturing codes of the United States Standard Industrial Classification:

Major group 20 Food and kindred products
Major group 21 Tobacco manufactures
Major group 09 Fisheries
2841 Soap and glycerin
2881 Cottonseed oil mills
2883 Soybean oil mills
2884 Vegetable oil mills, not elsewhere classified
2886 Grease and tallow
2887 Fatty acids
2889 Animal oils, not elsewhere classified
2892 Essential oils
2893 Perfumes, cosmetics, and other toilet preparations
2894 Glue and gelatin
1471 Rock-salt mining
2898 Salt

It *excludes:*

2042 Prepared animal feeds

11. OTHER (not elsewhere classified)

The Soviet sector consists of:

(1) Photo-cinema processing
(2) Other processing and manufacturing industries, not elsewhere classified
(3) Water supply
(4) Animal fodder industry

and may include the following categories of the United States Standard Industrial Classification:

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3842 Surgical and orthopedic appliances and supplies (but probably only a part of the United States category)
393 Musical instruments
395 Pens, pencils and other office and artists' materials
391 Jewelry, silverware and plated ware
3963 Buttons
394 Toys and sporting and athletic goods

2042 Prepared animal feeds

It also includes the following activities not specifically designated in the United States classification:
Film copying factories
Water supply systems

APPENDIX VI—W.—*Quotations of Monthly Wage Scales and Index of Wages for Various Occupations of Soviet Workers and Salaried Employees*

Year of reference	Occupation, type of wage and source	Amount in rubles per month	Index number
1955	Average wage of all workers and salaried employees	710	1.00
1958	Minimum wage (*Pravda*, Nov. 14, 1958)	270	0.37
1959	Junior service personnel (*MOP*) in education and medicine (computed from data in *Sotsialisticheskii trud*, No. 9, 1959, p. 49).	266–375	0.37–0.53
Introduced in 1937, in effect for certain in 1956.	Laboratory aide (cleaning and odd chores) in higher educational institution (*VyShkoSPR-1957*, p. 353) (increased since to minimum wage level indicated above)	150–200	0.21–0.28
Introduced in 1944, in effect for certain in 1956.	Cleaning woman in secondary school (Ministerstvo Finansov SSSR (Minister of Finance of the U.S.S.R.), P. A. Maletin (ed.), *Spravochnik raionnogo finansovogo rabotnika* (Handbook of Regional Finance Workers), Moscow, 1952, pp. 631-34) (increased since to minimum wage level indicated above).	225	0.32
Introduced in 1944, in effect for certain in 1956.	Primary and secondary school teachers (base salaries refer to normal teaching load of 18 to 24 instruction hours per week) [1] (Maletin, *op. cit.*, pp. 631-34).		
	Grades 1–4 urban	468–758	0.66–1.08
	Grades 1–4 rural	441–698	0.62–0.98
	Grades 5–7 urban	517–874	0.73–1.23
	Grades 5–7 rural	486–808	0.69–1.04
	Grades 8–10 urban	600–935	0.84–1.32
	Grades 8–10 rural	575–841	0.81–1.19
	Director of elementary 4–yr. school	545–719	0.78–1.01
	Director of 7–year school	635–1,092	0.89–1.54
	Director of 10–year school	735–1,380	1.04–1.95
1960	All teachers and directors in schools for working and rural youth received 15 percent *less* (Maletin, *op. cit.*, pp. 639-40), a differential which was eliminated on April 1, 1960 (*Pravda*, Mar. 19, 1960).	(Same as above.)	(Same as above.)
Introduced in 1944, in effect for certain in 1956.	Preschool (nursery) teacher (Maletin, *op. cit.*, p. 639)	425–500	0.60–0.70
1953	Primary and secondary school teachers (defector report, interview)	600–1,200	0.84–1.69
1956	*Actual* annual average wage of all workers and salaried employees in all types of educational establishments of the U.S.S.R. (computed from Ministerstvo Finansov SSSR, *Raskhody na sotsial'no-kul'turnye meropriiatiia* . . ., p. 46) was 7,221 rubles per year, or approximately 600 rubles per month.	600	0.84
Introduced in 1937, in effect for certain in 1948 and probably as late as as 1956 (though with some probable increases).	Personnel in Soviet higher education: basic wage scale (*SpravVUZ-1945*, p. 296)		
	Profess or-Department Chairman:		
	With doctor degree	1,700–2,300	2.40–3.24
	Without doctor degree	1,300–1,800	1.83–2.54
	Professor:		
	With doctor degree	1,500–2,000	2.11–2.82
	Without doctor degree	1,200–1,500	1.69–2.11
	Associate Professor:		
	With candidate degree	1,050–1,400	1.48–1.98
	Without candidate degree	800–1,100	1.13–1.55
	Teaching assistants and instructors:		
	With candidate degree	900–1,200	1.27–1.69
	Without candidate degree	700– 900	0.99–1.27

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APPENDIX VI—W.—Continued

Year of reference	Occupation, type of wage and source	Amount in rubles per month	Index number
Definitely in effect in 1956.	Senior laboratory technician	450–550	0.63–0.77
	Junior laboratory personnel	150–325	0.21–0.46
	Director of higher educational establishment (depending upon class of establishment)	2,000–2,500	2.82–3.52
	Deputy director of higher educational establishment	1,500–2,000	2.11–2.82
	Business manager of higher educational establishment	600–900	0.85–1.27
Introduced in 1944, definitely in effect in 1956.	Library personnel (*SpravVUZ-1957*, pp. 388-389; same in *SpravVUZ-1945*, p. 312):		
	Library directors	1,200–1,800	1.69–2.53
	Chief of libraries	900–1,500	1.27–2.11
	Senior librarians, editors, translators	750–1,200	1.06–1.69
	Ordinary librarians	325–550	0.46–0.77
About 1955	Personnel in higher education (*personal wage scale*) (Notes of Horace and Norton Dodge, subsequently adapted in Korol, *Soviet Education*, p. 306):		
	Professor	5,000–6,000	7.05–8.45
	Associate professor	2,500–3,200	3.52–4.51
	Teaching personnel (various categories)	1,050–3,000	1.48–2.82
1953	Persons with higher education without advanced degree in academic or research jobs (defector report).	1,200	1.69
1953	Persons with candidate degree *not* employed in academic or research jobs (defector report).	1,200	1.69
1953	Persons with advanced degree (candidate or doctor) in academic or research jobs (defector report).	2,400 up to 5,000	3.38 up to 7.05
Introduced in 1942, definitely in existence in 1948, probably in existence in 1956.	Research institute personnel (*Sprav VUZ-1945*, p. 318). These are all explicitly *position* salaries:		
	Institute director	2,000–2,500	2.82–3.52
	Deputy director	1,900–2,400	2.68–3.38
	Heads of divisions, laboratories, sections:		
	With doctor degree	1,700–2,300	2.39–3.24
	Without doctor degree	1,300–1,800	1.83–2.53
	Senior scientific workers:		
	With candidate degree	1,050–1,400	1.47–1.97
	Without candidate degree	800–1,100	1.13–1.55
	Academic and research personnel (individual earnings):		
1958	Professor, academician, chairman of a division of the Academy of Sciences of the U.S.S.R., director of a research institute (Soviet official visitor).	8,000	11.20
1958	Junior scientific worker with candidate degree in an institute of the Academy of Sciences of the U.S.S.R. (Soviet official visitor).	1,200	1.69
1958	Senior scientific worker in a research institute of the Academy of Sciences of the U.S.S.R. (Soviet official visitor).	2,400	3.38
1958	Professor at a university in a science field without advanced degree (Soviet official visitor.)	1,900	2.68
1957	Same as above	2,200	3.10
1958	Director of a research institute of the Academy of Sciences of the U.S.S.R. in a scientific field (Soviet official visitor).	3,500	4.93
1957	Same as above	5,000	7.10
1958	Director of a research institute of the Academy of Sciences of the U.S.S.R. in a scientific field, doctor of science (definitely *personal* salary).	6,000	8.45
1957	Same as above	7,500	10.60
1958	Director of a research institute of the Academy of Sciences of the U.S.S.R. in a social science field, corresponding member of the Academy, doctor.	4,500	6.35
1957	Same as above	5,100	7.20
1960	Deputy Minister of Higher Education (Soviet official visitor).	9,500	12.67
1960	Director of a polytechnical institute (Soviet official visitor).	4,000	5.65
1960	Director of polytechnical institute (apparently *general* salary) (Soviet official visitor).	2,500	3.52
Introduced in 1944, definitely in effect in 1954.	General provision on differential between *position* and *personal* salary (Aleksandrov, *Zakonodatel'stvo . . .*, 1947, p.72). Personal salaries may be up to 1.5 times position salaries, but are not to exceed the following limits in:		

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APPENDIX VI—W.—Continued

Year of reference	Occupation, type of wage and source	Amount in rubles per month	Index number
	(a) Ministries, administrations, offices, bureaus, and organizations and all subordinate enterprises of all-union *exceptional* significance ("first-class" administrations, plants and enterprises)	Salary plus up to 3,000	Salary plus 4.24.
	(b) Ditto, but all-union of ordinary significance ("second-class")	Salary plus up to 2,500	Salary plus up to 3.63
	(c) Ditto, but union-republic or local jurisdiction.....	salary plus up to 2,200.	salary plus up to 3.10.
Introduced in 1944, definitely in effect in 1952, probably in effect in 1956–60.	Public health personnel (Ministerstvo Finansov SSSR, *Spravochnik raionnogo*, p. 649; *Svod postanovlenii*, 1944, p. 35)		
	Chief physicians and directors of medical establishments.	950–1,800	1.34–2.54
	Their deputies.....	807–1,530	1.14–2.16
	Various dispensary or hospital physicians.....	790–1,300	1.12–1.84
	Practicing physicians, urban.....	600–805	0.85–1.14
	Practicing physicians, rural.....	640–930	0.90–1.32
	Medical nurses and secondary specialized medical personnel.....	325–600	0.46–0.85
	Auxiliary personnel.....	300–360	0.42–0.51
1953.....	Ordinary doctors in large metropolitan cities (defector report)...	up to 850	1.20
1956.....	*Actual* annual average wage of all workers and salaried employees in Soviet public health establishments (Ministerstvo Finansov, *Raskhody . . .*, p. 71) was 6,496 rubles per year	540	0.76
Introduced in 1947, definitely in effect in 1952, probably in effect in 1956.	Agricultural personnel (Ministerstvo Finansov SSSR, *Spravochnik raionnogo*, p. 516);		
	Agronomists with higher education.....	575–930	0.81–1.31
	Veterinarians with higher education.....	640–1,080	0.91–1.53
	Agricultural and veterinary technicians (with secondary education)	500–820	0.71–1.16
	Industrial personnel, *ETMP* (intra-unit industrial employment) (L. Kostin, *Wages in the USSR* (English translation of *Oplata truda rabochikh i sluzhashchikh v promyshlennosti SSSR*), Moscow 1960, pp. 60–61).		
1959.....	All data are for *position* salaries. The rules for *personal* salary differential (i.e., on top of position salary) as indicated above apply to most jobs of senior managerial personnel. Salary range is set depending upon plant size, its national importance and industry sector.		
	ETMP in metal processing and machine building plants:		
	Director.....	2,000–4,000	2.82–5.65
	Chief engineer.....	1,900–3,700	2.68–5.22
	Assistant director, second engineer, chief mechanic, chief power engineer, chief steel melting engineer, chief rolling engineer, chief of department (production, and technical control)	1,500–3,000	2.12–4.23
	Chief of department (designing, planning, labor organization, supplies and sales)	1,100–2,200	1.55–3.10
	Chief of safety department, senior dispatcher.....	1,100–1,900	1.55–2.68
	Chief of sector, bureau, shift dispatcher.....	1,000–1,500	1.41–2.12
	Senior engineer, senior designer, senior economist.....	1,000–1,350	1.41–1.90
	Engineer, designer, economist.....	900–1,200	1.27–1.70
	Technician.....	700–900	0.99–1.27
	ETMP in a metallurgical plant:		
	Shop manager.....	1,600–3,000	2.25–4.23
	Assistant shop manager.....	1,200–2,400	1.69–3.38
	Assistant shop manager (charging equipment and pouring divisions), chief of production sector, chief of technical control department, senior production foreman)	1,450–2,100	2.21–2.98
	Shift manager, mechanic, shop electrician.....	1,300–1,900	1.83–2.68
	Production foreman.....	1,300–1,800	1,83–2.54
	Shift dispatcher.....	900–1,300	1.27–1.83
	Senior sector foreman, senior control foreman.....	1,000–1,500	1.41–2.12
	Sector foreman, control foreman.....	900–1,300	1.27–1.83
	Senior calibrator.....	1,600–2,200	2.25–3.10
	Calibrator, chief of bureau.....	1,100–1,600	1.55–2.25
	Senior engineer, senior designer, chief rate fixer.....	1,000–1,350	1.41–1.90
	Engineer, designer, rate fixer, economist.....	900–1,200	1.27–1.41
	Technician.....	700–900	0.99–1.27
	Production workers in skilled and semiskilled occupations in Soviet industry:		

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Appendix VI—W.—Continued

Year of reference	Occupation, type of wage and source	Amount in rubles per month	Index number
1959.....	Coal industry (computed on the basis of daily rates by grade) (Kostin, *op. cit.*, p. 29)	576–2,160	0.81–3.06
1959.....	Brickyard workers (*Sotsialisticheskii trud*, No. 2, 1960, p. 49)	392–635	0.55–0.89
1959.....	Petroleum and gas industry (*Sotsialisticheskii trud*, No. 7, 1959, p. 53)	465–1,400	0.66–1.98
1959.....	Machine building plant (Kostin, *op. cit.*, p. 28).....	515–1,460	0.73–2.08

[1] Teacher salaries are pro-rated according to the instruction load. In the 1930's and 1940's, with the teacher shortage, some teachers carried a heavier than normal instruction load. In the 1950's the majority of teachers carried a normal instruction load.

[2] Note that in the data for academic personnel for 1955 and 1958 below, we have a personal wage scale which is probably inflated by the fact that no distinction is made between salary and *total* earnings due to (1) possession of advanced degree; (2) performance of more than one function; and (3) multiple-job holdings.

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[a] After 1959, MVSSO SSSR (Ministerstvo Vysshego i Srednego Spetsial'nogo obrazovaniia SSSR).

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Adygeiskoi avtonomnoi oblasti	Leningradskoi oblasti
Adzharskoi ASSR	L'vivskoi oblasti
Altaiskogo kraia	Molotovskoi oblasti
Amurskoi oblasti	Mordovskoi ASSR
Arkhangel'skoi oblasti	Moskva (gorod)
Astrakhanskoi oblasti	Moskovskoi oblasti
Belgorodskoi oblasti	Murmanskoi oblasti
Brianskoi oblasti	Novgorodskoi oblasti
Buriat-Mongol'skoi ASSR	Novosibirskoi oblasti
Chardzhouskoi oblasti	Omskoi oblasti
Checheno-Ingushskoi ASSR	Orlovskoi oblasti
Cheliabinskoi oblasti	Penzenskoi oblasti
Cherkasskoi oblasti	Primorskogo kraia
Chkalovskoi oblasti	Riazanskoi oblasti
Chuvashskoi ASSR	Samarkandskoi oblasti
Frunzenskoi oblasti	Smolenskoi oblasti
Iaroslavskoi oblasti	Stalingradskoi oblasti
Irkutskoi oblasti	Sverdlovskoi oblasti
Ivanovskoi oblasti	Tambovskoi oblasti
Kabardino-Balkarskoi ASSR	Tatarskoi ASSR
Kalininskoi oblasti	Ternopol'skoi oblasti
Kaluzhskoi oblasti	Tian'-Shan'skoi oblasti
Karel'skoi ASSR	Tiumenskoi oblasti
Khabarovskogo kraia	Tomskoi oblasti
Kirovogradskoi oblasti	Tul'skoi oblasti
Kirovskoi oblasti	Udmurtskoi ASSR
Komi ASSR	Ul'ianovskoi oblasti
Kostromskoi oblasti	Velikolukskoi oblasti
Krasnodarskogo kraia	Vinnitskoi oblasti
Krasnoiarskogo kraia	Vladimirskoi oblasti
Krymskoi oblasti	Voronezhskoi oblasti
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